

European Distance and E-Learning Network (EDEN) Conference Proceedings

EDEN 2001 CONFERENCE

Learning Without Limits

**Developing the Next Generation of
Education**

Proceedings of the EDEN 10th Anniversary Conference,
held in Stockholm, Sweden

10-13 June, 2001

Edited by

András Szűcs, Erwin Wagner and Carl Holmberg
on behalf of the European Distance Education Network

European Distance Education Network

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András Szűcs
Erwin Wagner
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on behalf of EDEN, the European Distance Education Network

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Introduction

The European Distance Education Network, as the most comprehensive European association for open and distance learning organises, since 1992, annual conferences for the European community of open and distance learning. These conferences developed to major academic and professional ODL events in Europe, supporting professionalisation and international exchange of experience in the field.

In 2001, EDEN is celebrating its 10th anniversary. The jubilee conference in Stockholm, arranged during the Swedish EU Presidency, will be the main event of this special year. Organising the conference in Sweden also indicates EDEN's esteem towards the Nordic region, where its strong membership group is coming from and where the importance, professional and academic culture of open and distance learning is traditionally very high.

The title for the Conference is ambitious: “**Learning without limits - Developing the Next Generation of Education**”. We intended by that to *support professionalisation* of the actors of open and distance learning, enable *critical and constructive reviews* of ODL over the last 10 years, demonstrate and explore the *operational integration* between various educational sectors and systems, offer an *arena for exchanging experience* among the participants and present *research and development work* covering new initiatives in open and distance learning.

The conference themes cover *Informal arenas of learning* - occurring beyond traditional lecture halls and formal credit programmes, addressing different aspects of integrating multiple forms of learning opportunities into daily life and in the workplace. *Tearing down boundaries* – as distance education methods are often embedded in the developing new structures of education, ways of working in different education systems seem to merge, and so may do education systems, breaking barriers between educational sectors and institutions. *Opening the systems* – meaning open systems are placed on the political agenda in a number of countries and new student groups, new providers are expected to enter education putting new demands and challenging the education systems. *Searching for best practice* aims highlighting and sharing new trends and practices, giving unlimited chance for professionalisation, as new demands on education grow in praxis and so do new methods. The *European dimension* refers to the increasing networking and co-operation within Europe, strongly supported by the European Commission, and targets its further development as well as investigating the impact of globalisation on the European learning arena.

The response to the Conference Call was impressive and the challenge, going somewhat beyond the traditional keywords, seems to have been well understood. The recent developments, intensive changes in technology and our societies lead to reformation of categories, problems, solutions. Multiplicity of concurrently emerging new elements and attitudes is certainly challenging, meanwhile there is an evident need to safeguard professional values and quality, supporting orientation, appropriate understanding and systematic approach.

We are convinced that the Stockholm Conference will serve as confirmation of commitment of EDEN, acting as supporter of professional development of ODL and digital education, which are important factors of modernisation. We are most delighted to welcome as conference speakers and delegates highly reputable professionals of open and distance learning from Europe and other continents - theorists, developers and practitioners - who brought progressive visions and valuable experience to share with the interested international educational community.

The Editors

Acknowledgement and thanks are given to the collaborators and supporters:

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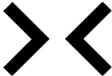

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UNIVERSITY EDUCATION IN LAW: INSTITUTIONAL PARTNERSHIPS AND THE SUPPORTED OPEN LEARNING SYSTEM

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Veronica Barnes, Law Programme Manager, The Open University, UK

The OU-College of Law partnership operates the largest taught undergraduate law programme in the UK. It currently has 2,300 registered students who are situated all across the UK. We also have groups in mainland Western Europe. In the UK, as elsewhere, there have been historically erected barriers between universities and professional training colleges. The Open University - College of Law partnership is a good and innovative example of how historical barriers can be torn down with benefits to people who were previously on both sides of the barrier.

In Law, some pretty old questions and issues often present themselves to us as entirely new developments. Thus we find that modern practice of berating lawyers for over-use of ancient Latin can be traced back at least as far as Cicero's condemnation of such predilections in 63 BC. Similarly, agitation in some quarters of the legal community about whether new techniques for delivering legal education are acceptable is also an anxiety with a good tradition. Thus, the work *Can English Law be Taught at the Universities?* By A.V. Dicey was published in 1883.

The nature of legal education is in the process of significant change in the UK today. Until recently in historical terms, the study of law in the UK was primarily associated with education for professional practice. Law students, the great majority of whom intended to practice law, underwent three years of full-time undergraduate study on a law degree, followed by a year's professional training course to pass the examinations of the Law Society (for intending solicitors) or the Bar Examination (for intending barristers). Those successful in these examinations then went on to complete their necessary periods of practical apprenticeship. Studying for a postgraduate academic qualification was relatively rare. This position existed until the early 1990s.

Today, the picture is very different. Of the 12,000 law graduates produced by the universities each year, more than half are not moving directly into practice. A great many move into academic postgraduate law courses, and use their legal education in multifarious fields of endeavour. Insurance, banking, public service, welfare advice, politics, research, local government, corporate affairs, journalism and teaching are some of the areas favoured by law graduates. University Law Schools are becoming what some pioneers sought for them to be three centuries ago - thriving academic centres of the university. And there is another notable change one finds in looking at cohorts of law undergraduates – whereas 30 years ago, almost all of first year undergraduate law students were 18 year-old, middle-class white people who had left secondary school with good grades, today's intake is much more sociologically diversified.

Delivering academic undergraduate Law through supported open learning techniques - off-campus learning - is a relatively new development in the UK. Today, along with my colleague Veronica Barnes, Law Programme Manager at The Open University (the UK's largest university), I shall aim to explain something of how we approach open learning in Law. I shall make some general observations about legal education and then move on to say something about our tutorial methods. Veronica Barnes will address the theme of how we try to incorporate off-campus learners into Open University life.

In his study of the English Law School, *Blackstone's Tower* (The Hamlyn Lectures, 46 Series, 1994, London: Sweet & Maxwell), Professor William Twining suggests that:

“The study of law is in the process of becoming re-absorbed into the mainstream of our general intellectual life, as it was from Blackstone's time until the late nineteenth century, and this is a welcome development” (p. xix)

The Open University law degree, run in collaboration with The College of Law, has a great many law students. In 1945 in England and Wales, the total number of Law undergraduates in all three years of

Law degrees was 1,515. Today there are 87 university Law Schools in the UK but the intake at the OU for the next academic session will be 1,500 first year students. We are, in fact, the UK's largest taught undergraduate law degree, with a total of 2,300 students, and we aim to enhance the role played by the law graduate both in professional terms and by enriching other fields of endeavour with our graduates. We aim to continue the tradition of Blackstone (first holder of the Vinerian Chair at Oxford in 1758) who sought to establish the study of English Law as a university subject. The English Law School in fact is a relatively recent development, certainly post Second World War. Although Canon Law, jurisprudence, and Civil Law (i.e. Roman Law) were studied at Oxford from the twelfth century, the first degree in English Law set up at University College, London in 1826. There were in England and Wales in 1909 only 103 teachers of law, a figure which by 1934 had only risen to 130 (Twining, 1994, op. cit. p. 26). Today, there are about 2,000 university law lecturers in the UK.

Tutoring and the OU system

The Open University has much experience at operating a tutorial system specialising in the needs of adult learners. Strictly speaking, tutorials are an optional extra for our students. Everything a student needs to pass the course is contained in the boxes of materials despatched to all students; text books, manuals, resource books, videos, audio-tapes, CD-ROM and so forth. Students are assigned a personal tutor with whom they can maintain contact throughout the course by telephone, email, and fax or correspondence. Additionally, in the Law Programme we offer some 26 hours of face-to-face tuition in groups of about 20 students. These are usually held in educational institutions or study centres in each UK region.

A key Open University document expresses the position of many OU students in this way:

" Open University students may not have a single person among their friends or at work who understands, or is interested in, what they are studying. An Open University student may find it almost impossible to have a conversation about ideas in the course except in a tutorial..." (Open Teaching, Chapter 1).

We encourage students to form into study groups and many do so, but the OU formal tutorial is, for many, a vital occasion to engage in a shared learning experience. The challenge for the tutor is to harness the students' desire to talk about their studies, and to facilitate a learning environment in which students can engage actively and purposefully with their course materials.

Student groups vary greatly at the OU, and thus we cannot be too prescriptive in respect of the tutorial format and how to cater to student needs. One of our groups is, for example, in a prosperous residential region and of the 19 people in the group, almost all are professional graduates with different reasons for taking the course - a gynaecologist, and architect, two teachers, a veterinary surgeon, a librarian and so forth. In another group in a run down part of an inner city we have a group with a number of people who have no experience of formal education since they left Secondary School - they might include highly competent people (say a mother who has brought up three children and seen them into college, become tremendously well-read and able to stand up to banks, hospitals, High Schools, customer complaints managers, et al.) but nonetheless people who need careful guidance in the art of academic learning.

During the course of each nine-month course, students will have to submit seven Tutor Marked Assignments (TMAs). Taken together, the students marks for these assignments will constitute 50 per cent of his or her overall mark for the course, the remainder coming from a three hour unseen examination paper. The structure of most Law tutorials, therefore, is partly governed by the TMA requirements. We advise tutors to spend some time at the beginning of the tutorial reviewing performance over the last TMA, and some time towards the end previewing the next TMA. What happens during the middle section of the tutorial varies but as most of our students will be travelling considerable distances to attend we try to ensure the tutorial is a well-planned event.

Off campus teaching

Aims

One of the most important aims of the Open University/College of Law qualifying law degree (LLB) is to enable Open University students to feel that they are part of a law school which is concerned and involved in not only their instruction and examination in law but also in their intellectual development. However, on this course all of the law students' learning takes place off-campus, making the course a unique opportunity to enable people to study for a law degree who would otherwise find it difficult. What then are the potential problems in achieving our aim?

Potential problems

Students who study on-campus have everyday access to their law school which includes the building (which often has an academic "atmosphere") the academic staff (with whom they will have lively and stimulating discussion in lectures, tutorials and the corridor) other students and the library (where they have access to an enormous range of legal texts).

We have to take all of these benefits to our law students via self-study materials (the package with support) who work off-campus. This will be explained later.

In order to understand the size and nature of the challenge, the way in which the degree course works is explained below. The Open University/College of Law qualifying law degree has open access i.e. there are no age or qualification restrictions. Students are not required to have any existing academic qualifications. In addition, the timetable according to which students study is fixed in that each course starts in February and ends in October, with a fixed sequence of topics and tutor marked assignments. Importantly, however students are free to decide when and where they study and their use of support tutors.

How can we design a law degree which is learnt off-campus, supports open learners and gives students a similar experience to on-campus law school? Much of the emphasis must clearly be upon the basic design of the overall learning experience and the nature and quality of the materials provided.

ICT

The programme has hitherto used modern Information and Communications technology in various ways. We have provided approved website resources for students (identifying reliable journals, and law reports etc), and have offered free access to the electronic retrieval system LawTel. We are currently offering students who wish to carry out their research options via the internet or with CD ROM the opportunity to do so. They have access to the extensive resources of the Butterworths electronic law library. From February 2002 all our undergraduate students will be required to have access to the internet as an integral part of their studies.

Overcoming the potential problems - the method

The Open University / College of Law qualifying law degree uses a package with support. The package, developed by the College of Law in conjunction with the Open University, involves a variety of media: print (e.g. written word and pictures) audio-visual (e.g. audio-cassette tapes and videos), computers (e.g. CD ROM and on-line services and in the future computer conferencing), and practical work (e.g. Study Day on how to use a law library). Given this varied package (which does include some personal contact), could it not be argued that this would be sufficient?

Experience shows that packages without support are not enough:

"Learners without support are most liable to delay their completion of a programme or to drop out altogether. They simply have no-one to turn to when they run into problems" (Derek Rowntree, Exploring Open and Distance Learning).

The support systems which go with the package for distance-learning students have been planned and refined over many years by the Open University; the College of Law has also contributed to this from its own experience and knowledge.

What we provide for the students

How then do the law packages teach? What media best suit the objectives? At the commencement of each law course we provide our students with a package, all elements of which together combine to communicate everything a student needs to know to successfully complete the law course:

The package comprises:

- **Course calendar**
This gives students a clear idea of their study programme by telling them what they will be studying in each week of the course, what components of the package they will need each week and when their tutorials, assignments and examinations take place.
- **Study Guide**
This is extremely important in that it gives students clear advice about the aims of the course, how the course is structured and what legal topics they will be learning, what the course components are and how to use them, how to get support during their studies from tutors, the assessment strategy and learning outcomes and how to develop study skills in an off-campus law course. All this information is therefore conveyed to the students as part of the package. The Study Guide is written in a way that it can to some extent take the place of a tutor. There is also an introduction to the course given in a video which makes the experience more personal. The students can and do ask their tutors about studying the courses, but they do not have to if they do not want to.
- **Tutor-marked assignment (TMA) booklet**
This contains the assessed work for the course, detailing deadlines and marking procedures. There is information concerning the guidance tutors will give on assignments and how tutors assess and give feedback on the assignments.
As part of the process of making the assessment process transparent students receive all their assessments in advance (within the booklet) with clear instructions as to how to tackle each assignment. They need to know where to find the relevant law and how to apply it to the questions asked. Legal writing is very difficult, and this type of support is essential if the student is going to avoid disappointment and perhaps failure.
- **Specimen examination paper and guidance notes**
Students receive a specimen examination paper with clear guidance notes so that they are fully prepared for the actual examination in October.
- **Study Manuals**
The most important part of the package is the Study Manuals. These are specially designed interactive study texts, divided into manageable amounts called units. Each unit corresponds to a week's work of 14 - 16 hours, which means that when students start to study a unit they know how long it should take them. Each unit has clearly stated objectives, so the students know what they should be able to do by the end of their week's study. They know that they will be assessed on how well they demonstrate the abilities listed as objectives.
The study manuals contain activities throughout the text and consolidation activities (usually at the end of each unit) to facilitate the students' learning. Throughout the study manuals students are asked to complete activities to help them place the legal subjects they are studying in context. This planned interactivity is assisted by the fact that the students are mature and a large proportion are in full-time work; activities are therefore designed to enable them to bring in their own experience and examples and reflect on their own thoughts and feelings.
Manuals help to prepare the students for TMAs and the examination (and longer-term studies). The manuals provide plenty of opportunity to test and apply what the students have learned with clear guidance throughout.
The manuals are carefully designed to assist the students and keep them interested. For example, we try to write friendly and approachable materials using plain everyday language and using "You" and "I". We give examples, pictures and diagrams all with clear explanations which give the students a

chance to draw on their own experience and apply what they learn to their own situation.

We have also given considerable thought to how the manuals are presented, and have tried to make format, layout etc. an integral and helpful part of the process. The layout of each unit (white space, headings, bulleted lists etc) is designed to help the student know exactly where they are at any one time.

There are links throughout the manual, usually within an activity to other media where appropriate, just as a tutor might remind students of previous studies or refer them to news stories.

- **Resource books and Case books**

The package is the primary source of legal knowledge so all resources must be provided. The resource books and case books are the students' law library. Materials within the resource books comprise cases, statutes, articles, newspaper cuttings, documents, forms etc. Although the student cannot draw on the same wide variety of paper sources as a student who has easy access to a well-stocked library we do make available as wide a range of best quality materials as possible. The materials provided are such that there is scope for anyone to perform at a first class level comparable with law students in other institutions.

- **Video**

The video programmes comprise talks, discussions, interviews and acted scenes divided into parts lasting from 2 - 30 minutes. Within an activity students are asked to stop the tape after each part and answer questions about it. Each programme is introduced by the same person (a tutor equivalent) to give a sense of continuity.

- **Study Day and IT**

Being able to find legal information is essential for a law degree. We have tackled this in various ways. One is to bring the student to the law library (the study day), the other is to take the library to the student (on-line services). We also run a Research Day for students to give education in how to conduct legal research using paper and electronic systems in a law library.

These component parts create a package which provides a teaching and learning environment which supports the student throughout the course.

There is no doubt that it is difficult to take the law school to the student but we feel that we have gone a good way towards doing this based on feedback from our first four presentations.

Incorporating off campus students into university life

The Open University is the UK's largest university with over 200,000 students and customers but it is different! All students are adults who study part time. Most students are in paid employment and have other commitments. Undergraduate courses are open to all regardless of educational qualifications or age. Students are taught by "Supported Open Learning" a method of teaching which the Open University is still the champion of and has perfected over the last 30 years. Students can now take a range of certificates and diplomas, degrees and postgraduate degrees. The largest group of students are the undergraduates currently approximately 150,000.

Visitors to Open University campus at Walton Hall, Milton Keynes are always surprised that this 112 acre site has no undergraduate students on it!

Study materials are specially designed to help students prepare for study. They offer broad introductions to subject areas, and at the same time give students a chance to try out the style and quality of Open University learning materials. However, just because there is little if any physical presence doesn't mean these undergraduate students are not part of a lively supportive community – striving to increase knowledge and making a mark on society.

Students' motives for studying vary tremendously. Some study for career development or to update their job skills, some for personal challenge or satisfaction and others for all of these reasons. Some take just one course, others work for an Open University degree, then go on to postgraduate study and still come back for more.

Open University study can be highly addictive!

Law at the Open University is a new venture. The collaborative programme with The College of Law is still in its infancy but the introductory course W200 *Understanding Law* is still the largest undergraduate law course in the UK with 1500 students anticipated in 2000.

The Student Community

Once a potential student has decided on a course to study, they make their first commitment and become part of the Open University student community. There are two steps to becoming a student.

1. Reserve a place on a specific course.

At this first stage students are immediately issued with a Personal Identifier – a discreet number which they will then use for all subsequent Open University study and contact.

More information is then sent including detailed course descriptions, information about support services, how to pay fees, how to approach employers (or the Open University) for financial support and details of any computing requirements.

2. Complete a registration agreement with commitment to pay.

This second stage then secures a place on the course.

Students do not need to go through this process alone!

We have advisory staff in thirteen Regional Centres throughout the UK and Open University representatives in other parts of Europe who help with any questions. We offer advice about choosing courses, preparation, study arrangements or difficulties, tutorial support and financial assistance.

The Academic Community

The success of the University's open entry is ample proof that students with diverse academic backgrounds can study at degree level.

You need no formal qualifications to register with the Open University. The level of study is the same as at any other UK university and students need self-discipline to study and make space in their lives.

Most people, though, are keen to use the time before their courses begin to prepare themselves as well as they can, and we encourage this. Study materials are specially designed to help students prepare for study. They offer broad introductions to subject areas, and at the same time give students a chance to try out the style and quality of Open University learning materials.

An important feature of Open University study is the teaching and counselling support. Students are part of a small group attached to an Associate Lecturer (Tutor), with whom they can keep in touch by telephone, e-mail, fax or correspondence. Tutors will help with the course material and mark and comment on students written work. Depending on the course chosen and where students live group tutorials may be offered. These usually take place on weekday evenings or on Saturdays, and although they are not compulsory students are encouraged to attend if they can.

In Law courses we offer tutorials throughout the UK and Europe. There are usually 7-9 tutorials in an "OU" year (February-October). These have a duration time of 2-4 hours, total tutorial time is between 20 and 26 hours. Group ratio of tutor to student is approximately 1:20. Some more remote regions or regions with scattered student populations may replace group tutorials by other forms of contact such as telephone, fax, computer conferencing and e-mail. Or day schools are arranged rolling together a number of tutorials. Where at all possible students are supported.

In Law our tutors are either active legal educationalists or practising lawyers.

Another way in which students interact on a smaller scale is through informal study groups known as "self help groups". These are run by students sometimes meeting in homes or pubs and increasingly communicating by e-mail. They discuss topical issues in the course, how their studies are going, what

they might be aiming for in the future, etc. Although there is no “official” input into these, the Open University actively encourages them.

The Open University library has recently extended its opening times. It primarily meets the needs of the campus academic community, but local Open University students can also access it. More and more material including databases are available to the student electronically via the internet and all students can access these on-line, so extra material for study is accessible.

The Broader Community

There are various other ways that Open University students are included in a community.

Distance Learning students often feel quite isolated and not sure where to turn, they can always contact OUSA representative. The Open University computer conferencing platform is “FirstClass”. OUSA is developing a local branch structure. This is already used for student discussions divided on a faculty basis. Students with access can go into OUSA study rooms and discuss their courses or use it for social contact. An OUSA web page will soon be launched which will be a major step forward in student communication. The Virtual Campus Map (Figure 1) shows that there are areas for all Faculties as well as Library, Information Centre, etc.

A new initiative is now underway giving all students with internet access, the ability to access relevant administrative data. They will be able to see their own records and when their material is due to be despatched. They will also be able to change their address or update their own records directly. The Open University’s advances in ICT are clearly “enabling” to many students.

In addition OUSA has a number of affiliated student societies which students can belong to. Law students created the Open University Law Society in the very first presentation year – an example of the enthusiasm of our students! Although many of the societies are academic related, others are of a more social nature, e.g. the Chess Club. One of the more recent additions to the student community is the Alumni Association. This organises dinners, carries a feature “Open Eye” in The Independent newspaper and tries to maintain the link between the institution and its students.

- Graduation Ceremonies. Degrees are awarded at very large public ceremonies where thousands of people attend to support the graduating students. Key public figures are always involved e.g. Cherie Booth QC, wife of Prime Minister, Betty Boothroyd, Speaker of the House of Commons (who is The Open University Chancellor), HRH The Prince of Wales and Lord Jenkins of Hillhead (former President of the European Commission), to name but a few.
- Open Day is held every other year. The Walton Hall campus is opened to all students, families, local residents, etc. With fine weather it can be an enjoyable and informative day out. Students can meet academic staff and see where they work. For scientific subjects experiments are often set up. Exhibits tempt students to look at new areas of study and lectures from academics can whet the students’ appetites. In 2000 over 12,000 visitors attended.

Conclusion

The Open University-College of Law partnership can be seen as an innovative collaboration between a university renowned for its academic achievements and a national College with a world class reputation for professional education and training. The university has gained the capability to become more professionally oriented in aspects of its delivery (and this has helped in its work with other professions like Accountancy) and The College has gained experience in undergraduate academic work which enhances its abilities in other areas.

LEARNING FROM HYBRIDITY: POST GRADUATE COURSES IN COMPARATIVE LITERATURE

Mona Sandqvist, Lund University

Introduction

I'd like to communicate some conclusions from a newly finished project supported by Distum, the Swedish Agency for Distance Education. The project was called Distance models for National Post Graduate Courses in Comparative Literature. It was led by professor Anders Palm at Lund University; I was the assistant project leader. What makes it interesting for me to talk about this project, is primarily the great advantages we found in the use of a hybridity model for post graduate education. In our case it appeared as a good solution to actual problems with course organization on the post graduate level. But I think the model is well worth being integrated in a more general perspective. My conclusion is that the mix of mediated instruction and traditional face-to-face instruction could be applied also also in other levels and in other disciplines.

Background

The general problem that had to be solved was the difficulty of organizing courses on post graduate level after the reform of post graduate education in 1998. According to this new regulation, the departments must guarantee the financing of the individual post graduate's education, and as a consequence, they can only admit a very small number of post graduate students every year. The ensuing problem is that which concerns course planning: it is pointless to organize a campus course for one or two individuals.

This question had been discussed on a national level between the professors of comparative literature since 1998, and some sort of national courses seemed to be the solution to the problem. The development of ICT resources and the possibility to get financial support for distance education projects through Distum opened the perspective towards new ideas. Anders Palm and I formulated some alternatives for development of distance models and with the support of the professors of the eight universities with post graduate education programmes in comparative literature, we got the opportunity to test a model called "Internet – Internat", i. e., a course design consisting of a mix of on-line-seminars and boarding-house seminars.

The course subject chosen was Theory and Practice of Text Interpretation. It had to be a subject of interest to all newly accepted postgraduates, and a subject which could be accepted as relevant by the professors in the other universities. There was a rather hot discussion about different alternatives in a national conference, but finally all agreed upon the subject of text interpretation. We also sent out the preliminar course plan and literature list to our colleagues in order to get their approval and it was only after a process of some weeks that we finally had formulated the course program and could present it to the postgraduates all over Sweden. The program was distributed to the 8 universities in the beginning of spring 2000. We got 12 course participants, representing all the concerned universities.

Course implementation

The mix of online-elements and face-to-face-elements was organized like this:

Face-to-face I: Weekend meeting in Lund March 17-18

Internet period: On-line-seminars: March 20 – May 29

Face-to-face II: boarding house seminars in Arild

Face-to-face I: Weekend meeting in Lund March 17-18

The meeting took place around the following program:

- Day 1:

Course information, distribution of course literature, photography
Lecture on Interpretation by Anders Palm
Dinner

- Day 2:

Presentation of our web-tool, Luvit, with hands-on exercises in the ICT-lab at CITU
Introduction to Internet resources for research in comparative literature
Lunch

The meeting seemed to lay a very fine ground for the rest of the course. The photos of the participants were published along with their self presentations on the course site which favoured the personal exchange during the Internet period.

Internet period: On-line-seminars: March 20 – May 29

We had three seminars on three weeks each under the following headings:

1. Introduction: Reading – analysis – interpretation
2. Contextualization and Contextuality
3. Comparison and Intertextuality

Each of the seminars consisted in a introduction to the chosen theoretical concepts and a schedule for the activities of the seminar. All seminars contained the following elements:

- study of literary text
- study of theoretical text
- solution of a problem focused on theory
- solution of a problem focused on practical interpretation
- every participant's feedback to each other's solutions
- the two teachers feedback to the participants work and the participants answers

The problems were formulated in a rather open way, and the solutions showed great variations, which made it interesting to take part of them and which facilitated discussion. The timetable for these activities was rather detailed and the formal instructions very strict. Experience shows that there is a great need to be very clear and explicit when formulating tasks on line, as the possibility of spontaneous feedback and comprehension control is restricted compared to campus education.

We also regarded it as necessary to make a certain number of the individual contributions obligatory, and make stipulations for their dead-lines and their quantity of words. You never can rely on the spontaneous lust for discussion, but if you create a favorable set of definite conditions for it, you can see the most interesting sub-seminars appear as a result of the first, obligatory statements.

We also gave ourselves deadlines in the schedule for teacher feedback. It is a good thing to make this an obligation, to avoid the negative influence of teacher's activity being postponed in view of other tasks, a belatedness which always make the students disappointed and tends to lessen their energy.

During the tenth and last week of the internet-period the participants had to work on an individual project task.. Before May the 29 they had to publish a paper concerning a problem of text interpretation connected to their own dissertation subject.

Face-to-face II: Boarding house seminars June 5-9

This part of the course took place in a small hotell at Arild, a little fishing village at in a very beautiful coast landscape about 80 kilometers to the north of Lund. The stay was financed by the participants' university departments just as their journey to Arild. The choice of this very pleasant type of accomodation was motivated by our concern to facilitate the social contacts and well-being among the participants. The postgraduates of today are the academic teachers and leaders of tomorrow, and their personal acquaintance ought to be an advantage for them in their future professional cooperation.

Every day's program in Arild was in principle focused on the following activities:

- a lecture with seminar discussion
- a seminar concerning some of the participants' project papers

Some of the lectures were held by invited professors from some other universities than Lund University, which among other things resulted in a most engaging discussion. A disagreement on a high level, not likely to have been exposed in an ordinary campus course.

The formal result of the course was as good as can be. All of the participants finished all their tasks in due time and all of them brought their attestation with them when they left Arild.

Course evaluation

During the course the participants had to answer three enquiries, the first after the first of the three on-line seminars, the second after the last on-line seminar and the third after the week in Arild. Their answers are very positive and they have given us insights to reflect on and to develop in new course projects.

- Advantages of Web seminars

The most interesting thing is perhaps the participants' great appreciation of the web seminars. I will give a few citations (in my own translation, of course):

"I have learnt more from the web seminars than I would have done from ordinary seminars, because I prefer participating with written and thus more well-reasoned arguments."

"I would never have thought that a web seminar could be so much more lively and engaging than an ordinary seminary."

"It has been very useful to express oneself in written form as it make great demands on precision. It has also been very agreeable to reply and discuss with the others."

"The greatest advantage of the web seminars is that all participants express themselves in the seminar and acquire an assurance that they can bring with them to the face-to-face seminars. This insight ought to be considered when you create courses paying respect to equality between the sexes – as the silent girls are more numerous than the silent boys."

"Compared to a traditional course I think the internet couse can even be more effective, since it demands equal activity from all."

These favorable opinions concerning the web seminars has fortified our own experience of their great advantages. For the individual it is very important that all can express their views, that you can refine your arguments successively, and that everyone gets several responses, from the participants and from the teachers, to their own statements. The discussion as a whole takes on a greater quality as the statements are more thoroughly reflected on. The statements remain and can be used later on, for further reflection and work. It is possible to develop the collection of reflexions on a special problem to a resource for others.

Our course participants also have some ideas for making the web seminars still better. The most self evident is the proposal to reduce the stipulated length of a statement. That is very easily done, and it is

easy to see, that shorter obligatory texts would give greater opportunities to grasp the discussion and more time to spontaneous discussion.

Many of the participants also want more teacher response. They say for example that the teachers ought to participate in the discussion from the beginning and that both the teachers ought to give a direct reply to every individual reply to the problems stated in the seminar. The need for feedback seems very deeply rooted, but I wonder if it is possible or even desirable to try to satisfy it in the proposed manner. The policy we followed was to give our response in the end of every seminar. One of us commented on the discussion as a whole, and the other one gave comments on the different types of individual answers. It was really a rather tough job to take in the discussion and work out commentaries that ought to be interesting and well informed in a principal manner.

I think there is a risk to avoid here. If you are too eager to respond as a teacher to every participant's input, you tend to encourage an attitude of dependency of authorities. As a matter of fact, the participants often get the most qualified and interesting answers from their comrades, simply because they all at the same moment are so deeply involved in the problemsolving activity.

Some of the participants also wanted us to increase the interactivity by discussions in real time, for example to have chats around central concepts. We also had an idea - which we did not test - of organizing synchronous "time for questions". The answerer could be the teachers, but it could also be an expert in a certain field, someone from another university, perhaps one of the authors of the theoretical papers in the literature list. A motivation for courses on a national basis is that it becomes possible to use the best capacities in the cooperating universities.

- Appreciation of the hybrid form

Although so many of the participants are favourable to the web seminars, there are scarcely anyone who advocates that post graduate courses could be held exclusively on the web. The great majority want the mix of forms. A few citations:

"Internet seminars without the boarding-house seminars would have left the initiated work half-way. We have had the opportunity of getting into contact with other post graduates from all over Sweden and that is very valuable. In that way this course has been like an introduction to the academic community."

"I regard the on-line/face-to-face-alternative as much better than traditional types of courses, because it firstly implies seminars with more participants and secondly gives good secondary effects in the form of national contacts."

"It would be valuable to have a course of this type every year, every time organized by different universities."

The most radical proposal is given in these words:

"All traditional post graduate courses could be substituted by national courses of this on-line/face-to-face-model. In that way specialist competence could be concentrated to one course, money could be saved and cooperation between the institutions promoted. This would be of advantage not only to the postgraduates."

Conclusion

Whatever the results will be concerning national post graduate courses, I think it is important to take into consideration the great advantages of the hybrid course model. I can foresee a time when planning courses for post graduates in a local department, for example at the Department of Comparative Literature at Lund university, we will apply that model as a rather natural solution. The course will be scheduled as a mix of on-line and face-to-face periods. The ICT-tools and the web material that make up the frame of the activities during the on-line-period continue to play their role during the face-to-face-periods. The on-line discussion climate, favoured by the equality-promoting trends of the web seminar, has a chance to live on in the real time seminar room. The dominance of the teacher's voice is attenuated by the democratic discussion habits acquired on the net. New formations of educational groups and teaching teams is

favoured by the increased availability implicit in the use of internet. Finally, all this is of course transferable to other levels than the post graduate.

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OUTCOME-CENTRED EVALUATION OF TRADITIONAL AND OPEN AND DISTANCE MODE TEACHING AND LEARNING METHODS FOR SOFTWARE ENGINEERS

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1. Introduction

A quick glance over the past thirty years or so, shows how rapidly education patterns have changed. The pace of change is fast and likely to get faster. It seems that the natural curiosity will and should be transformed via the *lifelong learning* framework into a learning revolution. Different requirements in education mirror different requirements in society and in industry. In addition, different teaching approaches and learning methods appear in use in order to facilitate the learning process and support different learning styles. In the recent years the history of education has recorded a spectacular shift from didactic and non-participative approaches to group work and participative approaches in teaching and learning. Being that the case, the existence of enabling technologies as educational tools facilitate and promote the learning process while they support traditional models and techniques of teaching which in fact are still within the infrastructure of new and/or hybrid teaching methods such as: *Computer-Assisted Learning (CAL)*, *Intelligent Tutoring Systems (ITS)*, *Open and Distance Learning (ODL)* [1, 2].

Recent technological advances in the field of data communications, networks and multimedia facilitate global connectivity, which enables true networking and provides opportunities for innovation and helps business people, scientists and educators to become better informed about each other's efforts. Open University was the pioneer in the field in the early 60s [3]. The development, delivery and assessment of curricula provide academics with constant pedagogic challenges. The frenetic changes in computing technologies, development environments and paradigm shifts in software engineering present additional complications to the teacher and the learner.

2. Management Commitment to Open and Distance Learning

The vision of the University encompasses Access and Opportunity, Regional Development, Internationalism and Quality. A focus on the adoption of Technology based Teaching and Learning embodies the vision and philosophy of the University, embracing new technologies for the design, delivery and assessment of curricula to take us into the next millennium. Broadly speaking, this translates into practical steps to:

- introduce and apply new methods of teaching and learning;
- facilitate asynchronous learning;
- harmonise the processes of open and distance teaching and self-directed learning;
- integrate similarities, differences, teaching and learning methods via a framework
- that increases learners' skills and lecturers' productivity;
- ultimately penetrate the market with innovative successful ways for independent lifelong learning in a new education era.

3. The Hong Kong Project

The course involves the delivery of eight advanced modules comprising the final year of the BSc (Hons) Computing to students who achieved their pre-requisites through studying for a Higher Diploma or equivalent. Most students are working in the IT industry often in positions of responsibility (project managers, operations managers, systems programmers etc). The mode is part-time evening and the duration is normally two years although a sizeable percentage (17%) of the first cohort completed in 18 months (3 semesters). In parallel, the modules are running in the UK as part of the modular scheme of the

University. The students in the UK are primarily exposed to traditional methods of teaching and learning with a gradual but steady take up of modern methods and technologies.

3.1 Environment and Society-Attitudes towards Learning

Education in the Asian culture seems to play an extremely important role as a great agent to:

- educate and civilise individuals and societies and increase employability;
- promote respect of the individual within society;
- make lives richer and more prosperous;
- offer prospects for progression and enhance earning power;
- bridge the gap in society between the haves and the have-nots;
- acquire competitive skills and therefore competitive advantage.

Thus, there is fertile ground for provision of distance mode education particularly for adults who are already in employment and aim to obtain formal degree and professional qualifications.

3.2 Course Management and Joint responsibilities

The responsibilities of all involved are specified, agreed and published as follows:

The *co-ordinator* of the link (based at the UK University) is responsible for:

- ensuring that the quality of the teaching and learning experience is maintained to the highest standard (monitoring, moderating the assessment process and products)
- liaising with the Head of School and the Dean of Faculty on issues of planning and resources including allocation of staff to the link
- timetabling the tuition and co-ordination visits
- overseeing the development/updating of the distance mode materials
- liaising with the administrative and international representatives of the distant partner institution
- liaising with the distant partner institution course tutor
- providing support and guidance to the lecturers
- managing the financial aspects by the distant partner institution and authorising expenditure
- attending co-ordination visits in order to monitor and facilitate the whole operation •consulting with university bodies and agencies on marketing, recruitment, finances, and quality assurance issues
- monitoring and evaluating progress overall and ensuring the quality of the provision
- preparing and presenting revalidation of the course
- managing the review and improvement of the course
- authorising direct entry into the course by applicants with qualification awarded by institutes other than the distant partner institution
- presenting proposals regarding extenuating circumstances and assessment offences to exam boards
- attending boards of study and exam boards and all meetings when in Hong Kong

The *course tutor* (at the distant partner institution) is responsible for:

- co-ordinating the distant partner institution and liaising with the link co-ordinator
- collating and sending the fortnightly progress reports

- allocating project supervisors to students in collaboration with the UNL project co-ordinator and ensuring that all in-course assessment and project marks are submitted to the co-ordinator in time for the exam boards
- providing support to the distant partner institution tutors
- providing support to the students ensuring the quality of the teaching and learning
- investigating all assessment offences and presenting a report to the co-ordinator.
- documenting all extenuating circumstances and present them in a report to the link co-ordinator and ensuring that the module monitoring is carried out, and the forms are sent to the module lecturer.

The *module lecturers* (based at UNL with one Hong Kong tuition visit) are responsible for:

- delivering all the lectures in the distant partner (during the intensive tuition visits).
- specifying the assignments and the marking scheme
- briefing the module tutor(s)
- co-ordinating the progress through examining the fortnightly tutor's progress reports
- writing and marking the examination paper
- attending the students' presentations and provide feedback
- sampling the marked assignments ensuring that the module monitoring forms are processed
- attending boards of study and exam boards and all meetings when in Hong Kong
- liaising with the distant partner institution tutors and with the link co-ordinators
- assessing, planning and monitoring the progress and the development of the link

The *module tutors* (based at the distant partner institution) are responsible for:

- providing support (classroom and/or laboratory based) to the students during the weekly tutorials, and supervising the group and individual courseworks
- writing fortnightly progress reports (which the lecturer considers)
- marking all courseworks and providing feedback to students
- producing progress reports for the course tutor
- producing a resume of the module statistics and of the students responses.
- attending boards of study and project panel meetings held in Hong Kong

The *students* are responsible for:

- attending lectures and tutorials and engaging in problem solving and self-directed study
- working individually and in groups planning, developing and delivering their tasks
- participating in peer assessment of presentations and through their representatives in boards of study meetings by providing feedback on progress, problems and suggestions.

3.3 Information Systems Development Methodologies

The course includes the final year module of Information Systems Development Methodologies which aims to:

- develop an awareness of the various methodologies that have evolved for Systems Development, to draw comparisons between them and evaluate them

- promote practical experience of the Analysis and Design of a small system by employing techniques from a methodology in current use and
- provide understanding and experience of using automated tools to aid the systems development and thus improve the quality of process and product.

The module is fundamentally a problem-solving vehicle [4] which students experience working both in groups and individually [5]. There is an emphasis on viewing methodologies within a taxonomy spanning soft, hard, hybrid and specialised families of methodologies [6, 7].

3.4 Web-based Learning Resources

The students are issued with a textbook which covers the fundamentals of the module for continuous and general reference. The web-based materials comprise [8, 9] the following:

1. The syllabi (as listed in the Course Definitive Document),
2. A weekly plan of work, individual entries for each week specifying the topics (what) the learning objectives and outcomes (what and why),
3. A list of resources such as books, journals, relevant websites, that the student should use in order to achieve the latter (how to achieve the above),
4. Assignment specifications with deadlines,
5. Past examination papers and indicative model answers, case studies and exercises,
6. Conferencing facility for posting questions – open to all students, lecturers and tutors, indeed to whoever accesses the site!

4. Parallel Delivery and the Results so Far-Gradual Introduction of ODL Materials

During the last two years the course has been running in parallel in the UK and in Hong Kong. The same lecturers deliver the modules in the two countries. Students take the in-course assessments and the same examinations in real world time. In each case they have local tutorial support and access to hardware/software and library resources.

The students in the UK follow full-time mode of study whilst the students in Hong Kong study part-time evening. At the beginning there were no distance mode materials for either of the groups. Thus the first cohort in Hong Kong studied through traditional Face-to-Face lectures which were delivered over a period of 4 weeks with 2 weeks at the end of the semester dedicated to addressing outstanding issues, and to revision.

As the materials were being developed [10, 11] they were introduced into the programme. In the steady state students in Hong Kong study in ODL mode with a brief one-week tuition visit whilst students in the UK study in a hybrid of ODL and Face-to- using the same materials. They have approximately 35% more Face-to-Face tuition.

Understandably, tutors and students do not have the time to browse through a mass of information to find the material suitable for their lessons. Many students who need to study content which is not on the syllabus view it as wasting time.

5. The results so far

Fig.1 shows the percentage pass rate of three consecutive cohorts in Hong Kong with FTFFAST (Face-to-Face Fast Mode) followed by ODL1 during which distance mode materials were introduced gradually and ODL2 where the ODL materials were fully developed and we entered the steady state.

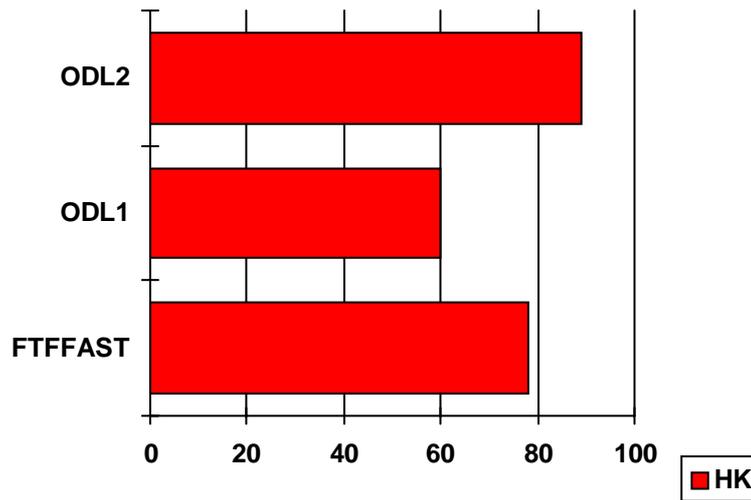


Fig.1 – Gradual Introduction of ODL

Fig.2 shows the respective pass rates for three parallel cohorts. They follow a similar pattern with the exception of the Feb99 where there is a noticeable increase of the Hong Kong pass rate. This can be attributed to the fact that the group was extremely small (12 students) compared to the parallel UK group which was over 80 students.

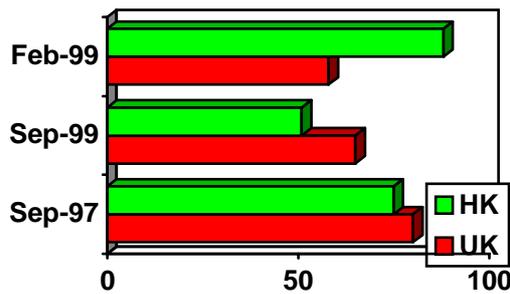


Fig.2 – Comparability of Pass rates (UK and HK)

Fig. 3 shows the distribution of the results in both cases. The Hong Kong students have a poorer profile in terms of high marks otherwise the performance is comparable. Language difficulties on the part of the Hong Kong students might explain the fact that they find it difficult to excel in questions where they are required to reflect and produce discursive answers.

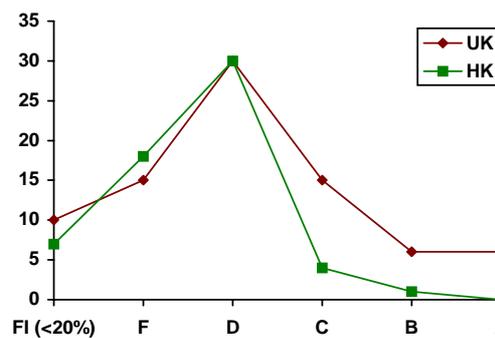


Fig. 3 – Profiles of UK and HK

Table 1 compares the outcomes of the two most comparable cohorts in terms of numbers and percentage use of the new ODL methods and materials. The results so far provide encouraging indicators as to the effectiveness of the ODL materials and associated methods of delivery.

Table 1 – A comparison of the two groups (Feb99 intakes)

	UK (FTF/ODL)	HK (ODL)
No of students finishing	78	68
No of students passing	45	35
Average Marks for coursework	58	55.5
Average marks for Exams	43	33.3
Overall average	46.5	44.4

6. Concluding remarks, further action and investigation

The shift from traditional teaching and learning methods is exciting for both educators and learners but it does not work miracles. Curriculum technology-based support is vital when it is part of the overall strategy from the early stages of the development rather than an afterthought to increase sales. Students' understanding of these new forms of information will not be aided if we just encourage their use as another book on/or disc.

The indications from these early stages are that students studying in different modes and in different countries achieve comparable results. These similarities can be attributed to the fact that those engaged in ODL are empowered to carry out their own learning at their own pace, place and time. Further evaluation of the ODL materials [11], and the associated methods of delivery is necessary to ensure the quality of educational experience by students who study in a variety of other environments.

Web-based resources are a complement to good practical work for both educators and learners but never a replacement for it. In order to really fulfil their potential, ODL web-based resources have to become *more interactive* by their developers, so they will also add value to the teaching and learning process.

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A STUDENTS' VIEW ON THE LEARNING PROCESS IN ASYNCHRONOUS E-DISCUSSIONS – A PRELIMINARY ANALYSIS

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Introduction

Group discussions through electronic means as a learning environment have drawn a great interest within the education arena. Although this kind of learning situation normally is based on a student-centred perspective on teaching and learning, most research focuses more on the teacher's perspective than on the learners'. An exception is an ethnographic study of participants' experiences, conducted by Noriko Hara on an education-technology course. The aim of the study was "to increase understanding of the process and students' actual experiences in an Internet-enabled course." (Hara & Kling, 2000, p.2) Among the conclusions, Hara and Kling point out that "...we need more student-centered studies of distance education that are designed to teach us how the appropriate use of technology and pedagogy could make distance education more beneficial for more students."(ibid, p. 19)

In the present study, all the students' reports on learning and group processes within a course on "People, Computers, and Society" within the Department of Computer and Systems Sciences at Stockholm University have been collected and analysed. The aim is to give a better understanding of problems and possibilities experienced by the students using e-discussions in learning. This could help us to design better learning settings.

The studied course

The aim of the course "People, Computers, and Society" is to develop the students' ability to analyse the social aspects of computerisation. The course also aims at creating an understanding of how technology interacts with people and with society and at giving the students a better ability to use electronic conferencing systems.

This course is given in a format that diverges totally from all the rest of our courses. Only once do the students and the teacher meet face-to-face for an introduction. After that, all communication takes place within an electronic conferencing system. The students are to read articles within four themes, discuss them and write a summary in small groups. The summaries are then discussed electronically in the whole class. The students were informed that they would be graded mainly as to their contributions to the discussions. They should also deliver an essay to report on what they have learnt.

In the autumn of 2000, the course was running for ten weeks, 30% of full time, with about 50 students taking part. The course started with a three-hour face-to-face lecture. During this meeting, the teacher explained the course outline, introduced the discussion themes, and described the conferencing system KOM2000 (Palme, 1998) to be used. The students were divided into ten groups with about five students in each.

This time, the groups were given an extra task: to write a report on their learning and group processes. The resulting ten reports are the basis of this paper.

Research method

A grounded-theory approach (Strauss & Corbin, 1990) was used when analysing the group reports. The first step was open coding, trying to identify important concepts and dimensions. This procedure stimulates the discovery of categories and their properties. Important categories that were found were, e.g., organisation, group work, and learning. The next step, the axial coding, built on these categories. More knowledge could be created by formulating questions, e.g., "What did they learn?" or "Why did they meet face to face?" and searching for the answers in the texts. The third step is to find the core category and to systematically relate this to the other categories. The core category was found to be "learning".

Findings

The groups reported on learning in many different areas: How to collaborate at a distance, how to communicate via an electronic system, and how to learn from discussions. Most of the groups are mainly positive and say that they learnt a lot from the discussions, but three or four groups are mainly negative to the learning outcomes. None of them is solely positive or negative. Below, excerpts are given in italics (the present author's translation from Swedish).

As a group and as individuals we have received a deeper understanding of social and community consequences from the fast ICT development. I don't think I have learnt much that is new to me. But it has been interesting and fun.

Most of the groups have critical comments on the syllabus and successive instructions about course tasks, assessment rules, and the time schedule. On the other hand, most students valued the freedom given by the course format.

I'm not quite satisfied with the communication between teacher and students. I feel that too much has been changed [during the course]. The information was often, but not always, too sparse.

Much was unclear in the beginning. The best thing was perhaps that we got a rather great freedom concerning how we wanted to use our time and arrange our learning process.

Learning how to organise group work

Most of the groups tried to meet face to face, at least once in the beginning, in order to organise their work. Four groups, however, decided not to meet but manage all group work at a distance.

The first two weeks the collaboration and communication did not work quite well. It took some time before everybody had posted a message and thus shown that they were members of the group. One member left the course without telling the others. After that, we decided to meet physically to plan how to organise the work during the coming weeks. When this was done, I found that the collaboration within the group worked quite well.

One of the groups met twice for each theme, first to choose articles, then to discuss the summaries. One of the groups decided not to meet at all. Many groups noted that the first group meeting was important, and that it helped them find effective ways to co-operate. In the group that did not meet, most participants knew each other before this course. This was the only group that reported previous experience of working at a distance.

All groups divided the work between them in one way or the other. Some of the groups started out ambitiously, for instance with three people collaborating around the summaries. They soon found this too ineffective and went on in pairs or individually. In some cases, individual initiatives were taken to organise the work and this was accepted and even appreciated by group members. They commented that the first phase was more democratic and emotionally engaging. But later on, the work grew more efficient and flexible, and less stressful.

We noted that during the course, the group changed its behaviour. We started with a more democratic spirit where everybody should take part in the decisions. This was time-consuming and demanded that everybody was more involved with the group. Then, some members took the initiative to take responsibility for some work and most of the members accepted this because it was more flexible and efficient.[...] During the "democratic phase" of the group work, the members seemed to have a greater emotional involvement to react to summaries from other group members and commented more than during the later, more "goal-oriented phase".

None of the groups chose a group leader or co-ordinator, either consciously or just by chance. This seemed to work well in most groups but at the end, at least one of the groups was hesitant:

Maybe it would have been good to have a group leader who coordinated everything. This person should have the overarching responsibility that work was done on time and to see to it that everybody really invested the time agreed upon, so that the work was evenly distributed. None of us had previous experience; next time it will work out in a better way.

Learning from discussions

To discuss the themes with other participants is said to be stimulating and to give new perspectives.

In many ways this was a good way of learning, as it gave us the possibility to discuss one's own recently acquired knowledge with other group members.

Especially valuable was the possibility to learn from those who have more experience, from job or family life.

It has been enriching that so many participants seem to take this course while they are working. This ties the discussions to reality and gives an insight into how it is to be working. We have been impressed by the great knowledge mirrored in some contributions.

There were some complaints, e.g.: That the summaries are of an uneven quality: often difficult to understand and not deep enough. Contributions in the discussions were often said to be full of balderdash and empty of references to the literature. It was not considered good that participating in the discussion was mandatory. This would make for less involvement in the contributions. Some contributions just repeated what other people had already said, some were far too long. Focus is more on quantity than on quality.

The discussion was more of "tell what you think". Had there been a greater demand to have support for propositions, then we might have learnt more through research and literature.

One group found that if everybody did their preparations and took their part of the work, the collaboration could be very rewarding.

When everybody in the group was well prepared concerning the theories, the discussions were often very interesting and rewarding. This was when you got the real understanding and feeling for the material, that is through sharing each others ideas, thoughts and interpretations of the material.

Sharing the same interest and the same values about the group work seemed to be important.

Our opinion is also that we in the group have been willing to listen to each other and have not only stuck to our own view. Everybody could give suggestions and nobody was silenced. We have shared our knowledge and experiences, helped each other, explained and, above all, we have trusted, supported and pep talked to each other, which we consider enormously important for the learning process.

Learning how to collaborate and communicate asynchronously

The course has offered the participants the opportunity to explore the forum system and how to communicate through it. This was valued by the groups.

Our opinion is that the learning during the course has taken place on two different levels. One is the knowledge level, which is based on the articles that raised thoughts. The other is a more personal level: how to develop communication and interaction between oneself and other participants.

The first problem was to find out how the system worked and how to navigate in it. To write summaries and arguments was not easy; it had to be learnt and practised. The groups found that in order to get feedback on their contributions, it was better to write short and meaningful messages. What they missed most was the natural involvement and the joy in working, which often appear in physical meetings.

To work in a course at a distance gives many unusual experiences, both positive and negative. What you feel most unusual is not having physical contact with peers, only some kind of virtual cohesiveness. You have no idea about who the others are or what they look like, which in a way could be rather exciting but at the same time rather frustrating as you are used to doing group work “face2face”.

To work in groups asynchronously is very demanding but can also be effective and positive to certain groups.

To do group work at a distance is demanding for the members. [...] On the other hand, group work at a distance is effective in solving the task because the communication is more direct. This means that the time is not spent on lots of unnecessary ‘chitchat’.

[...] there are at least as many individuals for whom this way of communication is solely positive: Those who need some more time for the discussion or who want to reflect before expressing their opinion. For people with some handicap the computer-supported communication can be important...

It can be confusing and tiresome when a discussion spreads out in time because group members do not take part in the discussions every day. On the other hand, the discussions may be more focused on the task.

One of the things we learnt was: in order to work effectively in the group, the distance makes it necessary that group members are reasonably equally active in the system. This is practically impossible, as we noticed during the course. In the cases when you are dependent on quick answers from a group member and you don’t get it, it can be very complicated to conduct a discussion. This normally would be very simple to do. This indicates that a question, which normally can be handled in five minutes face-to-face, might take several hours, or even days to handle. What we learn from this is to be conscious about these problems and therefore create group structures and work forms contributing to solve these problems.

In our group, we agree that discussions in real time, where you immediately can ask and get an answer, are preferable. We find that the interaction then is felt more “completed” as the subject can be discussed to a point on one occasion and it is not as easy to loose the thread or the interest.

Discussion and conclusions

In the study reported by Hara and Kling (2000) the students had lots of trouble with the technology. They also reported about having problems with unclear course instructions and with an overwhelming amount of contributions to read. The students in that study also complained about too little and too late feedback from the tutor and the inflexibility of the course schedule.

In our study, the students did not have much trouble with the technology, naturally enough, being computer and systems scientists. We found, however, problems with unclear course instructions, too much to read, and about too sparse feedback from the tutor.

Did the students experience group cohesion? Woodruff (1999, p. 1) suggests that learning communities “are held together by four cohesion factors: namely, *function*, *identity*, *discursive participation*, and *shared values*.” The *function* is in our study the learning activities. To some of the students, however, the aim to get their course points might be more important than the actual learning outcome. The students also had different priorities when it comes to time to spend on the course. The *identity* is mainly constructed through the process of co-operation and communication in the group. As the groups had many mandatory tasks to fulfil in order to get their course points, there were many opportunities to construct a group identity. The *discursive participation* is what forms the community. Students took part in discussions, both in the small groups and in the whole class. Some of the groups witness that the discussions in the small group were important, inspiring and helping them to construct knowledge together. *Shared values* are created and maintained by the active participation in discussions and group work. It includes the rules for communication and the principles for how to divide the work responsibilities that the group

negotiates. Values like “democratic work organisation”, “sharing knowledge”, “helping each other”, “trust”, and “support” are considered by the groups to be important.

The task of the student groups - to report on their learning and group processes - has turned out to be an interesting event at three levels: (1) The students got to reflect upon their processes and may have learnt a little more from that. (2) Teachers can get an insight in the students’ experiences and opinions about the online group work and e-discussions as learning situations. This can help us to improve our course outlines and behaviours as teachers and tutors. (3) Researchers can dig deeper in this rich material to try to find theoretical explanations and relations between influencing factors.

One important but not at all novel conclusion from this study is that instructions have to be very clear in order not to take too much energy from the learning tasks. This may be even more important in e-discussions than in traditional settings. Another conclusion is that it is possible but difficult for groups to agree upon how to organise their work totally without meeting face to face. The building of a cohesive learning community asks for opportunities to construct a group identity and to develop shared values.

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DISTANCE CONTINUING EDUCATION FOR ENTERPRISES IN EUROPEAN UNIVERSITIES

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Introduction

In a recent survey we hold on university continuing education for enterprises, five European university centres for continuing education were visited, in five different countries: Finland, Norway, Belgium, United Kingdom and Spain. One of our topics of study was to find out what was the role that distance education could play in continuing education specially designed to enterprises, according to the experience these centres have in this field. In this paper, when we refer to distance education we mean education through Internet.

We wanted to assert to what extent could distance education be an answer to the present needs of enterprises, in our knowledge society. In fact, what really matters for companies, considered as learning organisations is not only knowledge acquisition, but much more than that: knowledge creation. Can distance education cope with this need?

1. Advantages and limitations of distance education

In our enquiry, the following advantages were indicated, as far as distance education is concerned: learning packages; formative intentionality of the materials; concern regarding students' needs and motivation; teachers' training; more concern on pedagogical issues; teachers' meetings; tutorial; building up of a pedagogical model from the beginning, and knowledge up-dating without time limitations.

The following limitations were indicated: standard education; high cost of materials; low social interaction; time consuming and sophisticated process; students might find it difficult to organise their study timetable; low teacher/student's interaction; students can waste their time travelling in Internet, instead of studying, and finally, group dynamics does not work so well in the Internet as in face-to-face courses.

When considering the above arguments, we should like to emphasise some of the positive features of distance education. Starting with modular structure of the courses, because of its flexibility, it is most adequate to students' diversity, thus allowing self-pacing of trainees. Two other positive aspect should be stressed: on the one hand, the processes for implementing successful distance education actually bring the focus on students' and their needs, not only in what refers to the content of the courses but especially on trying to find out how people learn and how people can be motivated. On the other hand, the best teachers can reach a much greater number of students than in face-to-face courses.

When we try to understand what pedagogical models are used in face-to-face university continuing education, in most cases we get to the conclusion that what still prevails is the lecture mode, or else we are informed that teachers are stimulated to have in mind that they are dealing with adults aged differently than the post-secondary students they face in normal courses. However, when distance education is discussed, that's when a determined pedagogical model is actually chosen (mostly models employing constructivist theories and stressing collaborative learning), when course planning is discussed and people are gathered to join together and have a common view of the education they are delivering.

Issues such as motivation and coaching are really taken into account and the reason is that because distance education courses are very expensive to build up, it is necessary to find out the best way to reach the student, to make him or her happy with Internet courses, otherwise distance education products will not be sold and, as we know, competition is hard. We view these kinds of concerns as very useful, not only for distance but also for face-to-face education. As a matter of fact, we are strongly convinced that such concerns will give a large contribution to all kinds of continuing university education.

2. University continuing education and the size of enterprises

Considering the whole of continuing education for enterprises (face-to-face and distance learning), from the five centres for continuing education inquired, three declared that their clients were mainly large companies; one declared their clients were mainly large and medium size enterprises and only one organises education specially directed to SME. Besides, this last example was publicly supported, SME contributing with no more than a third of the total cost of the courses.

Why do SME have so much difficulty in addressing themselves to universities for the continuing education of their staff?

Four main reasons can explain this difficulty, which can actuate either isolated or in combination: first, in many cases, SME cannot afford continuing education; secondly, especially in what concerns small enterprises, sometimes with no more than one or two individuals, managers have not a university education background, so, they often do not trust academics' skills and think university is totally apart from enterprises reality; third, high staff turnover prevents SME from investing in continuing education. Finally, due to information gaps, especially small enterprises are not aware of the strategic value of education and training for their competitive advantage. The lack of tradition in the relationship between academic world and work world might also be another explanation.

A study (GONÇALVES, 94) on training needs of Portuguese enterprises also showed that the demand for education and training increases with the size of enterprises, in other words, education and training are demanded mainly by large companies. In addition, it should be mentioned that the need of education and training for Portuguese SME managers is often stressed not only by politics but also by economists, due to the weak education and training of most of them (idem). More recently, an OECD report (OECD, 2000) claims for management training as a means to reduce the failure rates of small firms and recommends greater use of electronic delivery of training through the Internet.

3. Enterprises needs in continuing education

To offer continuing education programmes for enterprises, university centres for continuing education must know enterprises education and training needs. This turns out to be a problem when considering SME, especially very small ones. The above-mentioned study on Portuguese enterprises training needs (GONÇALVES, 1994) showed that it was very difficult to assert the explicit education and training needs of enterprises. When enterprises stated their training needs, they were referred to in terms of *social skills, learning to learn, being able of changing behaviours, teamwork skill, sharing managerial responsibilities and problem solving*.

On the side of the politics, as it was mentioned early, and in what concerns SME, *managerial skills* are also mentioned.

4. Face-to-face or distance education?

In our inquiry, directors of university centres for continuing education were asked about which of the two types of education – face-to-face or distance – they believe are the most adequate for enterprises. 40% are in favour of face-to-face, while 60% believe a combination of the two would be the most effective.

However, even those who are in favour of face-to-face education are also investing in distance education. Maybe because of the stress made on the last one by governments and European Union recommendations distance education is felt by these directors as a «challenge», although «there is a strong competition in this field of distance education for enterprises»; nevertheless, it is something that university continuing education «has to try».

However, it should be mentioned that as far as enterprises are concerned, none of the university centres for continuing education we have visited considered they had enough experience in the field of distance education. The problem is not just with the tools area, but also the expertise. In fact, most distance education experiences in university centres for continuing education are very recent, some had started no longer than a few months before our visit, and Internet courses were not developed yet, or they were just starting.

It is not difficult to understand why universities are so cautious in implementing distance education: related costs are one of the main constraints. They include hardware and software, the maintenance of the system, upgrades, technical support and telecommunication charges. Besides, as technology is in constant change, a huge effort has to be made in keeping up-dated. Time to retrieve investments is very short, which demands an almost immediate success or death of projects. On the other hand, technological development can make communication through Internet more and more attractive. This is, perhaps, one of the biggest challenges to university centres for continuing education. Actually, it is commonly accepted that university is traditionally resistant to change.

Expertise is also to be mentioned. As a matter of fact, there is a need to gather a good team of highly motivated professionals (to design, develop and implement programs) to effectively run distance education. Moreover, in a rapidly changing economic environment, regular surveys on enterprises needs are essential. Additionally, evaluation during the courses and follow-up should be implemented, and this is one of the main difficulties we have found out.

Other than such difficulties of distance education implementation, we believe interaction is one of the main constraints in this kind of education, especially when it is designed to enterprises. Not surprisingly, according to the information we gathered in university centres for continuing education, large companies rely more in face-to-face education, because of the interaction of professionals in continuing education activities. In fact, studies on «communities of practice» (Wenger 1998) demonstrate the importance of team interaction, shared vision and shared purpose in knowledge and skills acquisition.

Effective learning is more and more associated with communication and information sharing. Also management literature (Pappows (1999); Stewart (1999); Sveiby (1998) and Nonaka & Takeuchi (1997)) emphasise the relevance of tacit knowledge in building «knowledge organisations», where knowledge is created, shared and spread. Sveiby (1998) argues that knowledge is rooted in people and that knowledge creation occurs in the process of social interaction.

Face-to-face is undoubtedly more adequate to develop social interaction. Social interaction seems to be the «Achilles heel» of distance education, because of the lack of visual contact, impossibility of expressing and picking up non-verbal reactions and difficulty in establishing working relationships and ground rules for participation. Still we think distance education has an important role to play in continuing education for enterprises.

Face-to-face or distance education? It does not seem to be an either or issue. For longer programs, the best choice might be a combination of these two types of education, starting with face-to-face meeting. However, for small enterprises, especially in large countries where such enterprises are often geographically isolated, sometimes the issue is either distance education or no education at all. In this case, we think well should be left alone. Furthermore, attention should be drawn to the fact that SME often have problems to release their staff for attending continuing education courses. This can be avoided by some daily or weekly time devoted to distance education in workplace.

Yet, much information is needed directed to SME managers, who very often are opposed to such „newfangled ideas”.

5. Conclusion

University centres for continuing education can have a prominent role in continuing education and training for enterprises and some already do. Recently, stress is being made on distance education both by politics and by international organisations, although there is not much experience in such subject yet, as far as universities are concerned.

Distance education, combined with face-to-face courses, seems to be a good solution regarding continuing education for enterprises. Distance education appears as a limited solution because of the lack of social interaction and difficulties in teamwork.

Our research suggests that University centres for continuing education, which provide continuing education and training for enterprises should combine face-to-face and distance education. However, in some cases, mainly with regard to small enterprises scattered in large countries and with difficulty in

releasing their staff for outdoor training activities, distance education is sometimes the only opportunity such enterprises have to their continuing education and training. Moreover, politics and international organisations point out the relevance of distance education especially for small enterprises. Nevertheless, small firms are often unable to afford continuing education and training of their staff. On the other hand, we have to bear in mind that studies on how organisations learn show the relevance of social interaction in the learning process.

When implementing distance education for enterprises, we think a lot of research is needed both into funding models and into ways to develop social interaction. Furthermore, systematic evaluation during the courses and follow up should be done, as well as accurate training needs analysis.

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SEARCHING FOR BEST PRACTICE: DISTANCE EDUCATION THROUGH VIRTUAL LEARNING ENVIRONMENTS

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Introduction

The rapid growth of interest in the World Wide Web both provides a unique challenge to conventional paper-based distance learning and opens up new possibilities. Increasing numbers of universities are developing virtual courses using computer-based technologies and Virtual Universities are beginning to emerge. The Internet is well suited to open and distance learning (ODL) for reasons such being ubiquitous, flexible, timeless and interactive (Kenney, 1996).

This paper considers the issue of the most effective way to exploit virtual environments to support open and distance learning. In particular, it considers an environment known as the Virtual University developed for ODL students of Brunel University, London, England. The Virtual University consists of a suite of teaching and learning facilities that are loosely analogous to the features of a conventional university. The main components of the Virtual University are: Virtual Lectures (multimedia-based teaching), Virtual Seminars (electronic discussion boards), Virtual Tutorials (live text chats), and Virtual Exams (computer-based assessment). Such environments foster “any time/any place” learning models that are not only a different way of delivering knowledge, but also a powerful means of creating knowledge (Wilson, 1996). Compared with traditional environments, virtual learning environments have a wide range of potential advantages.

Advantages of Virtual Learning Environments

Virtual Lectures

The most original component in the Virtual University is the use of Virtual Lectures. Virtual Lectures consist of a specially designed multimedia package which contains all of the core teaching material in the same way that real lectures usually define the core content of a traditional university course. The design of the Virtual Lecture interface is key to the experience of students and is based on the principles developed in (Evans & Edwards, 1999). The package makes use of text, images, sound, video and interactivity to enrich the learning experience. The Virtual Lecture can be distributed on CD or made available over the Internet thus facilitating the three key characteristics of open learning: flexibility in location, time, and pace.

Virtual Seminars, Tutorials and Exams

Virtual Seminars serve the function of facilitating learner interaction by allowing the student to ask the tutor questions about the Virtual Lectures through an electronic discussion board. They also enable computer-supported collaborative learning (CSCL) by allowing students to answer one another’s questions and develop discussions and even debates. Unlike conventional seminars they are not confined to a particular time slot. They permit students and the tutor to discuss a given topic over an extended period of time (usually about two weeks). They do not require the geographical meeting of students to engage in discussion.

Virtual Tutorials facilitate increased learner interaction by allowing the student to engage in similar exchanges but in real-time through a live text-chat. They sacrifice student-determined timing (they must be scheduled) in return for immediate tutor feedback. Like Virtual Seminars they do not require students to physically meet up in order to participate.

Virtual Exams allow students to gain feedback on their performance through instant computer-based assessment. They benefit from its use as formative assessment as well as in its summative role. Virtual Exams also eliminate the overhead in marking since this is fully automated at the time of sitting. For reasons of space, the evaluation of Virtual Exams falls outside the scope of this paper.

Advantages of Virtual Lectures over Conventional Open Learning Materials

Virtual Lectures offer all the advantages of conventional open learning materials: learner-determined place, time and pace; learner review, self-assessment and omission. However they also offer five additional advantages.

Interactivity and Active Learning

Textbooks and paper-based open learning materials are non-interactive in the sense that they are unable to provide feedback in response to specific input from the learner. Good open-learning materials will usually attempt to anticipate likely responses or errors. But they are unable to give feedback to the particular responses of an individual student. Lack of feedback can discourage the undertaking of activities as Laurillard explains (1993, p.111):

“...there is nothing in the format of the print medium that requires them to do it. And many of them choose not to. Only a small proportion of students actually write something down when asked to do so in an activity...” [Italics in original]

However Virtual Lectures are able to provide interactivity through navigational tools and interactive self-assessment questions (ISAQs). These questions provide the learner with a constrained set of options in answer to a question, and provide specific feedback based on their selection. The interactive features of Virtual Lectures enable the learner to develop an *active* relationship with the learning material, unlike conventional materials in which the relationship is predominantly *passive*.

Adaptation

Since Virtual Lectures are interactive, they can adapt material presented to the learner on the basis of feedback. Whilst they cannot support interrogation by the learner, or build up a model of their understanding, they can use interaction to address problems in the learner's comprehension. Conventional open learning materials do not normally take account of student feedback in determining the path of the learner through the material.

Simulation

The power of multimedia means that physical or abstract systems can be simulated through computer models. For example, it is possible to simulate the behaviour of a nuclear power station, or the painting techniques of an Impressionist artist. Whilst these might be illustrated in conventional media through videos or photographs, simulations allow the user to experience aspects of a phenomenon interactively.

Demonstration

In paper media, demonstrations can only be achieved through textual narrative or by supplementing text with video or television. This means that without the use of computer modelling, demonstrations are confined to real world phenomena. The use of multimedia, however, means that it is possible to provide demonstrations of all manner of physical or abstract phenomena that might be difficult or otherwise impossible to experience. The build up of gases in a nuclear explosion, for instance, or the orbital of electrons in an atom.

Integration

It is possible to incorporate multimedia demonstrations in conventional open learning media through the use of video. Indeed, conventional open learning approaches often combine paper-based material with audio tapes, video tapes, or broadcast television. However, Virtual Lectures have the advantage that a variety of learning media such as text, diagrams, videos, or audio clips can be integrated into a single environment. This is one of the general pedagogical advantages of multimedia packages identified by Benyon et al. (1997).

The Virtual Learning Environment in Practice

In order to begin to assess the suitability of the Virtual University for distance learning, use of the environment was trialed on a mixture of students at Brunel University, London, studying courses that adopted an open learning approach. The sample included both undergraduate and postgraduate students, as well as full- and part-time students in addition to distance learning students. The lessons from the investigation have implications for all forms of open learning in general and distance learning in particular.

Evaluation

The effectiveness of the Virtual University was assessed over a three-year period using questionnaires with four groups of undergraduate students (97 in total) on a joint Computing Degree course, and a fifth group of nine postgraduates on an MSc in Multimedia Computing for eCommerce. An open learning approach was used with all the students for the relevant courses or modules. The sample size for the postgraduate students is too small to draw any definite conclusions. However the results allow some qualitative evaluations to be made.

The initial trial involved just Virtual Lectures and Virtual Exams. Virtual Seminars were introduced with the fourth group and Virtual Tutorials with the fifth.

The primary aim of the study was to assess the impact of multimedia-based teaching from the perspective of open learning. The secondary aim was to consider how well the different components of the Virtual University worked together and to begin an assessment of the implications for ODL students in the future.

As the study evolved, two different questionnaires were used. The first – the undergraduate questionnaire – contained three parts. The first part dealt with student's impressions of the Virtual Lecture in particular, the second part with their views of the (non-virtual) problem class, and the third part addressed the general issues of educational multimedia systems. It consisted of a total of 26 closed questions and 5 open-ended questions. A four level Likert scale was used to determine the level of agreements with stated assertions.

The second questionnaire contained four parts and was used for nine postgraduate students whose mode of study was distance learning. The first part dealt with student's impressions of the Virtual Lecture in particular, the second part with the Virtual Seminars, and the third part the Virtual Tutorials, and the fourth part the Virtual Exams. It consisted of a total of 15 closed questions and 3 open-ended questions. A five level Likert scale was used to determine the level of agreements with stated assertions.

Results

Table 1: Selected Undergraduate Questionnaire Results

Question	Strongly agree (%)	Agree (%)	Disagree (%)	Strongly disagree (%)	No. of Replies
1. The Virtual Lecture was a valuable contribution to the module.	50	45	5		97
2. The Virtual Lecture should have more self-assessment questions and interactivity	59	39	1	1	97
3. The user interface of the Virtual Lecture is clear and easy to use.	46	50	4		96
4. The Virtual Lecture is better than a traditional lecture.	30	43	23	4	96
5. The problem-solving seminars were helpful in consolidating my understanding.	46	44	7	3	97
6. It is not necessary to have a tutor present when working through the Virtual Lecture.	16	36	34	14	97
7. Please select the statement below which most closely reflects your personal view.					
a) (For this module) I would prefer to be taught solely through traditional lectures;	a	b	c		
b) (For this module) I prefer to be taught solely by Virtual Lectures;					
c) (For this module) I would prefer to be taught by a mixture of Virtual Lectures and seminars.	3	9	88		96
8. I enjoyed using multimedia application and preferred interactive multimedia to traditional textbooks.	35	52	11	2	55 ¹
9. I would like Virtual Lectures to be introduced across all my modules at Brunel University.	25	53	16	6	96
10. I prefer to run the Virtual Lecture at home rather than at Brunel University.	34	31	27	8	97

¹ Students in group four were not asked this question. Results for the first three groups were overwhelmingly in the agree/strongly agree category so it was omitted in favour of questions about the Virtual Seminars.

Virtual Seminars

For the undergraduates, the Virtual Seminars were introduced only for the fourth group of 42 students. Most respondents (64%) thought that the discussion board was a useful way to share knowledge. Despite this, 60% claimed they were not helpful in developing their understanding. When asked whether they found it time-consuming or embarrassing to post questions, more than half of them (57% and 69% respectively) thought it was not. Most respondents (67%) thought it would be useful to make use of Virtual Tutorials in addition to the other facilities.

Full-time v. Part-time students

In the sample of 25 in group 3, there were 12 part-time and 13 full-time students. Overall, part-timers share the opinions on most issues with the full-timers. But there were some striking differences between them. For the assertion “It is necessary to have a tutor present whilst working through the Virtual Lecture”, 62% of full-time students agreed, but only 33% of part-time students agreed. When asked whether they preferred to run the Virtual Lecture at home, 73% of part-time students agreed, whereas only 54% of full-time students agreed.

Table 2: Selected Postgraduate Questionnaire Results

Question	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	No. of Replies
1. The Virtual Lecture was an effective way to learn about the subject	44.4	55.6	0	0	0	9
2. Overall, the VL is better than traditional paper-based learning material	55.6	33.3	11.1	0	0	9
3. The Talking Head videos were useful	88.9	11.1	0	0	0	9
4. The ISAQs for each topic are too few or too many	33.3 ²	44.4	11.1	11.1	0	9
5. The courseware was easy to use (very satisfied...very dissatisfied)	22.2	66.7	11.1	0	0	9
6. I am satisfied with the flexibility of the courseware (satisfied...dissatisfied)	22.2 ³	22.2	44.4	11.1	0	9
7. The Discussion Board was helpful in developing my understanding	11.1	44.4	22.2	22.2	0	9
8. The Discussion Board was a useful way to:	a	b	c	d		9
a) share knowledge with others						
b) disseminate information	23.1	23.1	53.8	0		
c) clarify problems						
d) other						
9. The live text chat was useful for:	a	b	c	d		9
a) consolidating understanding						
b) solving problems	0	55.6	44.4	0		
c) sharing knowledge and experience						
d) other						

² too few

³ very satisfied

Discussion

The Virtual Lecture

The result shows that nearly all the students thought that the Virtual Lectures were an effective way to learn about the subject (95% campus; 100% distance learners) and that Virtual Lectures were better than traditional alternatives (73% campus - better than traditional lecture; 90% distance - better than paper-based). They liked the tighter integration of media and interactivity provided by the Virtual Lectures. All distance students considered the talking-head videos useful, apparently (from feedback elsewhere in the questionnaire) because it made them feel closer to the tutor. The results also show that nearly all the students were satisfied with the ease of use of the courseware (96% campus; 89-100% distance). One of the key features seems to be the provisions of the interface: 98% of campus and 78-89% of distance students demanded more interactivity and self-assessment. In the context of the general positive reaction this should be interpreted as supporting the interactive and adaptive characteristics of the Virtual Lectures.

Virtual Seminars and Virtual Tutorial

Virtual Seminars were introduced only for groups four and five. The results show that a majority of the students thought that overall the Virtual Seminars were helpful in developing their understanding (90% campus; 56-78% distance). For distance learners their primary utility was the clarification of problems compared with information dissemination and knowledge sharing.

Virtual Tutorials (live text chats) were used only with distance students (group 5). The results indicate that their main utility was in problem solving (over half) followed closely by knowledge sharing. None of the students chose “consolidating understanding” as their main utility.

Conclusion

This paper set out to consider the effectiveness of virtual learning environments for open and distance education. The Virtual University appears to offer substantial benefits to distance learners over conventional paper-based approaches to open learning. Virtual Lectures in particular provide an advanced interactive learning tool with distinct advantages in terms of engagement and flexibility. Students benefited from the interactivity of the environment and its self-assessment facilities. The Virtual Lectures have a number of advantages including interactivity, adaptation, simulation, demonstration and integration. They facilitate *active* learning rather than the more passive learning associated with conventional open learning materials. The Virtual University aims to be subject neutral. Further trials are planned to compare the reactions of students from less technology-focussed disciplines. Virtual Seminars and Virtual Tutorials proved to be an effective means to improve communication and interaction between the tutor and other students. The key challenge to open and distance learning authors and tutors is to exploit the full potential of virtual environments to provide the *interactivity* which is key to their success.

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ADJUSTING AN EXISTING PROBLEM BASED LEARNING MODEL FOR NETWORK-BASED LEARNING ENVIRONMENTS.

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Introduction

The introduction of Information and Communication Technology (ICT) using the Internet, has allowed the development of complex distance learning (DL) environments. Although at an early stage of development, a new generation of DL applications is currently being introduced by Virtual Classrooms or Integrated Distributed Learning Environments (Cravener 1998). These terms are rather new and not yet precisely defined. However, we can refer to a Virtual Classroom as the network-based environment, which resembles an in-campus academic classroom, with regards to interaction and functionality (Mattheos 2000). Rather than being a new medium, a virtual classroom is the powerful combination of a variety of media and resources, with the Internet as a backbone. Providing a wide variety of tools, all integrated in one learning environment, Virtual Classrooms could allow us to focus on the learning methodology rather than the media, thus in time creating a functioning theoretical and methodological framework for this type of learning.

In 1990 the Oral Health Sciences faculty of the University of Malmö adopted a new curriculum, entirely based on Problem Based Learning (PBL). The function of the PBL method relies upon the formulation of small tutor guided groups and the active participation of students in the problem solving procedure. Through a structured process of six different steps, students are encouraged to build their new knowledge, understanding and skills into the context of what they have already learned (Rohlin 1998). Problem Based Learning utilises small tutor guided groups, where the learning is based on the complex network of in-classroom interaction between students, tutors and learning resources. In the past, the available distance learning media could not facilitate this level of interaction. However, the structures of a contemporary Virtual Classroom appear to provide course designers with the necessary interaction levels to effectively accommodate PBL.

Several PBL models have been described and evaluated for in-classroom teaching in health education, however the experience towards adjusting any of the existing models to a network-based learning environment is very limited. The majority of Virtual Classroom applications reported so far have been based on didactic teaching models, with the occasional introduction of supportive problem solving “modules”. However, evidence exists that PBL is not less acceptable or less effective when used for distance learning, compared to traditional teaching models (Engel 1992).

The faculty of Odontology in Malmö, having the benefit of a 10 year experience with the PBL undergraduate curriculum, decided to adapt the currently used PBL model for network-based teaching, thus developing and testing a model for Internet based PBL. This model should allow students to benefit from the flexibility of distance learning through Internet, while preserving the learning philosophy, function and effectiveness of the in-classroom PBL. To further investigate this potential, a pilot study was designed using a continuous education course for health care professionals. This hybrid PBL course combined in-classroom meetings with synchronous and asynchronous communication over distance. The course was part of the faculty’s continuous education programme and it represented 5 academic credit points (ECTS). The aim of the present report is to present the initial findings from the pilot study and identify factors of importance for the implementation of PBL in network-based learning.

Material and Method

The PBL model adopted by the faculty of Odontology is already described and evaluated (Rohlin 1998). This method requires organising of the students into small groups, who attend “thematic” sessions under the guidance of a tutor. Each PBL session is developed around a clinical case, the so called “problem”. The process of studying and “solving” the problem follows six clearly identified steps (Table 1), which allow the student to reach the learning objectives. The first three steps are characterised by a high level of interaction and a strong element of “brainstorming”, while the last three involve organising and evaluating

information, structured presentation of knowledge and opinions, as well as the defending of a hypothesis. In the undergraduate curriculum each thematic session usually consists of two three-hour, in-classroom meetings separated by a week's interval. The first three steps are processed during the first meeting, while the three final steps are dealt with in the second meeting. The interval allows students to reflect upon the discussion, search and evaluate information and formulate a hypothesis.

The selected course consisted of five PBL cases on oral health care for the elderly that were studied in a period of four months. Eight participants were registered for the course and they were organised in two groups of four each. The participants were all professionals in the field of health care and had no previous experience with either PBL or distance learning.

It was decided that the course will combine in-classroom attendance with the Virtual Classroom structure, therefore the first three steps were undertaken as usually during an in classroom meeting, while the second meeting was replaced by a Virtual Classroom that combined synchronous and asynchronous text based communication over the Internet. The Virtual environment was constructed by means of the Webboards software pack (Duke Engineering/O'Reilly & Associates Inc.). The synchronous communication tool was an HTML based chat component, where all interaction takes place through the users' web browser. All synchronous discussions were recorded in the server and were evaluated after the end of the session. Measurements such as the total number of interactions, interactions per minute or per person, individual participation were carried out. Each group started with a strict chat protocol, which allowed the tutor-moderator to control the flow of discussion. Group 2 followed the protocol to the end, while group one decided after the first session to adopt a loose policy and everyone was allowed to contribute at will.

The asynchronous discussion was facilitated by a typical web based bulletin board system, where students had the possibility to post their messages, upload files or reply to previous postings under several thematic entities. All postings during the course were maintained, allowing a quantity and content assessment at the end of the course.

The in-classroom sessions were assessed by an independent observer. In-classroom interaction was recorded during five randomly selected periods of five minutes during one PBL session. Through this record it was possible to measure the quantity of interaction as compared to the data collected by the synchronous on-line discussions. The overall attitude of the participants towards distance learning and virtual environments was assessed by means of 2 structured questionnaires. Apart from demographic, professional and educational data the questionnaire included several statements to which the participants had to state the degree of agreement in a Likert scale. The competence of participants with computers was measured through a combination of 26 questions, representing tasks of increasing complexity. In the study, students are represented by capital initials S1, S2, S3, S4 for group 1 and lower case s1, s2, s3, s4 for group 2. The results were analysed with unpaired t-test.

Results

Asynchronous Interaction

One hundred sixty five postings were made on the asynchronous board throughout the course, with the average number of student postings being 11,5. Student S1 (22 postings) and student s1 (16 postings) appeared to have more postings than the average, while student S4 (3 postings) much less. However only student's S1 postings were significantly higher than the average ($p=0,03$). Tutor 1 had the largest number of postings (57), however the fact that tutor 1 was also the general moderator of the board appears to be responsible for this amount of input. In comparison, tutor 2 contributed with 10 postings.

In relation to the qualitative classification of the postings, 21 % of the postings were related to the actual content of the course and another 30% were uploads of essays and documents written by the students as part of their assignments. A 19 % of the postings were related to technology and troubleshooting and finally 29 % included miscellaneous comments.

Synchronous interaction

Interaction in synchronous discussions was studied in each group separately, as each group was allowed to follow its individual on-line strategy. A total of 597 inputs were recorded throughout the 5 on-line sessions in group 1, which totally lasted 418 minutes. Students had a total of 377 inputs and 220 (37 %) were from the side of the tutor. The average students inputs per session were 19,8 (SD 7,8), while the same for the tutor were 44 (SD 10,7). In group 2 a total of 589 inputs were recorded, 384 (65%) of them attributed to students. The students average number of postings per session was 19,2 (SD 7,2), while the tutors 41 (SD 8,8).

The differences observed in the amount of interaction among individual students failed to reach the level of statistical significance. However students S2 and S1 in group 1 and students s3 and s1 in group 2 were repeatedly more active during the chat sessions. The speed of the on-line discussion increases significantly from the first to the second chat in both groups (group 1: 60 % increase, group 2: 28 % increase). Although speed drops slightly in the discussions to follow, it is maintained higher than the level of the first session. The involvement of the tutor in the discussion appears to be decreasing as the sessions advance, reaching a level of 24 - 30%.

Five of eight students replied that they were not satisfied with the on-line meetings, mentioning that it was difficult to lead a proper discussion. However, six out of eight students considered the on-line discussions to be valuable for maintaining the contact among the group members. In addition only two students thought that the on-line discussions could be replaced by normal e-mails. Six out of eight also believed that there was no need for more in-classroom meetings.

In-classroom interaction

The evaluation of in-classroom interaction was structured in the same way with the evaluation of the on line discussions. Two differences are visible comparing the interaction in the classroom with the web-based chat. First, the speed of discussion in the classroom during a PBL session appears to be much higher, with an average of 13,4 interactions per minute, compared to the 2,1 interactions/minute, which was the highest amount observed during the on-line discussions. In addition, the involvement of the tutor in the discussion is much less in the classroom with a mean of 4,8 interactions per session (SD 2,1) amounting to 7% of the total interaction. Just as in the evaluation of the on-line discussions, the observed differences in the amount of interactions among individual students failed to reach statistical significance level. However, once again certain students appear to be repeatedly more active.

Evaluation of attitudes

The acceptance of PBL was very positive by all participants, who also agreed that this method can effectively be facilitated by a network environment. An overview of the findings in this field can be seen in table 2. The second and third columns present the means of the participants' responses before and after the course. The mean score in the computer competence test was increased from 8/23 to 10.3/23 after completion of the course.

Discussion

The purpose of this pilot study was to point out directions and trends and provide indications that would form a sound basis for the necessary future research plans. Testing the functionality and limitations of the technology employed was also among our aims. The manner of student selection and the absence of control groups meant that the scientific assessment of the learning outcomes could not be an objective of the study. The study design was decided to combine in-classroom teaching with the Virtual Environment, as some form of personal contact is repeatedly found to enhance the effectiveness of distance learning. In addition, previous experience reports that PBL is not easily applied in network environment if students have not some experience with the method. Therefore totally omitting in-classroom sessions was considered not reasonable in our case. Experience in studying the interaction in virtual environments is still limited and very few comparable results are currently available (Vrasidas 1999, Murphy 1997, Arbaugh 2000, Lang 2000). However, as most observations rely on subjective evaluations, the results presented so far are hard to duplicate, compare or generalise and therefore no safe conclusions can be

drawn (Phipps 1999). In contrast to many positive reports (Cravener 1999, Scutte 1999, Powers 1997, Gianni 1998, Arbaugh 2000), several studies on various interactive media have pointed out lower levels of interaction, inferior results, frustration or decline of the acceptance of the media among students (Dellana 2000, Jones 1999, Lewis 1998, Rogers 1998, Hara 2000). As the medium becomes increasingly used, it is necessary to find ways to evaluate and measure both the quantity and the quality of interaction that takes place.

It was observed that the in-classroom interaction during a PBL course was more than 7 times faster than the one on the net. The speed of interaction observed in this study comes in agreement with previous findings (Murphy 1997). It can be argued that on-line discussions, being text based and not verbal, represent a more structured way of interaction and demand a more careful expression, leading to a deeper understanding (Gianni 1998). Nevertheless, the extent to which this fact will compensate for the slow speed is yet to be proven. The learning objective of each session becomes of critical importance for the selection of the media. If the aim is for example the investigation of a problem or a brainstorm, a situation that demands much faster interaction, maybe in-classroom discussion might be proven much superior to on-line chat.

The tutor contribution in the on-line discussions seems to be dramatically increased in comparison to the in-classroom PBL, although traditionally the PBL method requires low tutor involvement. It is repeatedly mentioned that virtual learning environments are connected with increased time demands from the side of the tutors and faculty (Fox 1999, Mattheos 2000, Cravener 1999). However, this should not be compared with the time devoted to in classroom teaching, as tutor's role in the on-line discussion is much different. The on-line tutor is more the moderator of the discussion than the content guide. This was also evident in the asynchronous discussion board, where the tutor 1 (tutor-moderator) had 5 times greater number of interactions than the tutor 2 (simple tutor). It might be reasonable to assume that as users grow more familiar with the media and the way of discussing, there will be less need for a moderator and therefore tutors role will decrease.

Although most students considered chats a valuable and irreplaceable part of the course, yet they were not satisfied at the level of the interaction, perhaps comparing chats with the in-classroom discussions. Several previous studies including our own experience with undergraduate students (Mattheos 2001) have shown higher acceptance of the media. However, undergraduate students were much more familiar not only with the technology, but also with the different chat techniques and "Netiquette" (Spinks 1999), as most of them had been using chat for private conversations for years (Arbaugh 2000).

Another finding was related to students' participation in each discussion. Although the sample was too small to reveal significant differences, it was observed that certain students were repeatedly more active, while others presented low activity. This fact was observed in all three ways of interaction, with participation being more evenly distributed among students in the classroom rather than the Internet. This distribution is present in other studies as well (Murphy 1997). Although it was not possible to relate the amount of participation to any factors such as competence with computers, typing skills, age, gender etc, this observation challenges the wide spread, yet not evident, belief that virtual environments will allow "shy" students to participate equally (Arbaugh 2000). It appears that Virtual Environments come together with their own "shy" students, maybe the same ones who are "shy" in the classroom. The factors that might explain such an observation might be irrelevant to the media and are yet to be investigated.

The asynchronous discussion board was mostly used for presenting students' essays and discussing several practical matters. The postings that were actually related to the content of the course were limited. The present findings seem to agree with previous studies in both quantity and quality (Vrasidas 1999). It is observed that the content related activity of asynchronous discussions is significantly lowered when combined with chat and in-classroom meetings, as participants would prefer this media for discussions.

It is still questionable if synchronous on-line communication can replace personal contact, especially in cases where demanding methods such as PBL are employed. Synchronous discussions can be an effective supplement to in-classroom PBL learning, allowing greater flexibility and lifting the burden of continuous physical presence. In addition, some form of personal contact is reported to boost up the effectiveness of on-line communication (Mattheos 2001, Dewald 2000). The functionality of the media seems to rise accordingly to the experience of its users. Although interaction speed is much slower, communication and

expression have to be more structured, forcing students to organise their thoughts better, still in a very short time. This way, in terms of interaction, on-line text discussions are placed somewhere in-between verbal and written communication.

Until further studies have demonstrated the factors of importance with these types of communication, a combination of personal and virtual interaction seems to be the most beneficial and safer approach (Resnick 2000). The different components of a Virtual Classroom seem to contribute to learning in different ways. After all, the question is not which is the best medium, but how would the different media be combined to produce the best possible learning results, as directed by the students special needs and characteristics.

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Table 1. Six clearly identified steps that will allow student to reach the learning objectives within the PBL study group. From Rohlin et al 1998, (10)

<ol style="list-style-type: none"> 1. define the problem 2. generate hypothesis 3. formulate learning goals 4. collect additional information outside the group 5. synthesise newly acquired knowledge 6. test hypothesis

Table 2. Change of certain attitudes during the course. (1= strongly disagree, 6=strongly agree)
Before: mean score at the beginning of the course. After: mean score after completion of the course.

Statement	before	after
I can increase my professional competence through the use of Internet	5,2	5,5
In comparison to traditional education, network based distance education is more effective.	3,1	4
In comparison to traditional learning is network based distance learning more demanding.	4,8	4,8
In comparison to traditional learning is network based distance learning more stimulating	3,6	4,5
In comparison to traditional learning, network based distance learning demands more active involvement of the students.	5,1	4,8

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A PRAGMATIC SOLUTION TO DISTRIBUTE COURSES OVER THE INTERNET

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1. Introduction

Our University organizes evening lectures leading to a degree in computer science. Lectures take place two evenings per week and every Saturday morning. The students enrolled in this program are professional, with heavy family and business duties. They can not attend all lectures. Their need for self-paced and just-in-time learning is therefore just huge. To help these students, a project for broadcasting these lectures was started in 1999. The Internet appeared as a reasonable medium to distribute the course's content in order to reach a broad audience.

However, the chosen Internet-based solutions had to meet two major requirements in order to succeed. Firstly, the student may easily receive the lectures from home. Secondly, the cost of the chosen solution must be kept minimal for the University. The first requirement implies that we take into account the equipment at the student's home. Most students own a computer and a dial-up modem to access the Internet (as this project started when the Internet became available for a large set of users in Belgium). The bandwidth offered by a modem is drastically low. The volume of the signal carried through the Internet should therefore not exceed 28.8 kbps. Furthermore, all software's used by the students must run on different platforms and be free. The second requirement introduces economical and human constraints. On an economical point of view, the cost is made of investment and recurrent costs. Recurrent costs are the most difficult to finance and must then be kept minimum. On a human point of view, we have to consider the busy schedule of the University's teachers. We need to attract as many teachers as possible in the experiment in order to provide a valuable service for the students. But if the broadcast requires too much time, the teachers will not join it.

These constraints led to unusual technical choices. The aim of this paper is to explain how we achieved to broadcast and record hundreds of hours of lectures with very simple and affordable techniques.

2. Related work / State-of-the-art

Remote teaching using the World Wide Web is now very popular and many technical solutions exist. Let us review some of them by the light of the identified requirements.

1. Several commercially available software tools make it easy to design, run and manage online courses. Most of the platforms offer asynchronous course delivery, management system, secure logging, database-centered syllabus, discussion groups, testing, quizzes, etc. This kind of tools usually meets the user's requirement, but not the professor one for two reasons. Firstly, the cost of course remodeling is high (around US \$25000/year on a four-year basis, as estimated by Bodain and al [1]). Secondly, development of such a course must be planned months in advance and requires a lot of work. While a few professors are ready to revise their courses with such tools, it is difficult to convince many of them to do it.
2. The networking community has developed many software tools for the broadcasting of seminars or courses over the Internet. Some sites also provide stored versions of these broadcasts. Different tools are required to broadcast a given course. An audio tool captures the professor's voice and distributes it to the students. A video tool is used together with a camera to distribute the video of the classroom to the students. In some cases, the video of the remote students can also be distributed to the professors. Finally, a share-whiteboard is used to distribute the drawings of the slides of the professor in real-time. These tools are used to broadcast IETF meetings, networking conferences or inter-university courses. They are not suitable in our environment for two reasons. Firstly, they require a high bandwidth, typically found in universities but not at student's homes. Secondly, the freely available tools are usually based on IP multicast. IP multicast is an efficient technique to distribute the same

information to a set of students. It is enabled in university networks but only very few ISP's have developed it and rarely down to the home user.

3. H.323 systems have been developed to support audio-visual communication over IP. They support unicast mode. However, H.323 products can not fulfill the requirements of e learning. The lectures can not be broadcast to a large number of students and e-learning sessions can not be recorded and made available for latter asynchronous access by the students or the instructor. Furthermore, these systems require a high bandwidth and an operator for interaction between remote students and the teacher [2]. Other developments assume that students have an ISDN or an ADSL connection.

None of these solutions could fulfill our constraints. We therefore chose a solution affordable for both students and teachers.

3. Bi-media diffusion

We have decided to offer synchronous and asynchronous diffusion of the lectures, in addition to traditional classroom teaching.

Live diffusion

The required equipment consists of a LCD projector, a wireless microphone, and a computer for the classroom, a license for the streaming software, a Web server, a streaming server and its license. The same equipment can be used for several courses. Traditional classroom training takes place as usual. Most computer science teachers rely on slides to give their courses. The relevant content of the lectures is thus mainly in two media's: the teacher's voice on one hand and his slides on the other hand. These two media's are therefore transmitted separately for live events.

The professor is equipped with a wireless microphone to record the audio signal. The latter is compressed and then broadcast by use of the streaming media technology. Streaming audio is often used to distribute music or video. It has the advantage of using a flexible amount of bandwidth (between a few kilobits per second for dial-up users and a few tens of kilobits for better-connected students). The choice of bandwidth is adjusted to compensate for network conditions. If a fast connection becomes bogged down because of high network traffic, the server switches to a lower-bandwidth stream. When the congestion clears, the server switches back to the higher-bandwidth stream. The streaming player is freely available. We have chosen to encode the audio for two bandwidths: 28.8 kbps and 56 kbps. An Internet Relay Chat (IRC) channel is opened during live events. It allows remote students to ask written questions to the teacher. Teacher answers questions during breaks.

The teacher's slides are stored on a Web server as HTML files. The teacher uses a computer to view his slides through a Web browser. This computer is connected to a LCD Data Projector that projects the slides in the classroom. A Java application called WebConf is used to broadcast the HTML documents to remote students through a unicast connection. WebConf is a free software developed by INRIA [3] and its Java code has been modified to meet our requirements. WebConf operates like a Web server and is set as the proxy server of the teacher's browser. Every time the teacher fetches a new URL, the HTTP GET request sent by his browser is directed to the WebConf application. The latter then fetches the document, puts it in its cache and sends it to the remote students. The teacher can also write down on a physical whiteboard and have his whiteboard session published, thanks to a commercial tool [4]. This tool is mainly used to answer student's questions.

An alternative solution would have been to use the software RealPresenter. This software allows the simultaneous diffusion of PowerPoint slides and of an audio signal over the Internet. But the use of a browser for the projection of the slides offers more flexibility. Any html page can indeed be transmitted and any software, as StarOffice, Latex or PowerPoint, can be used to make the slides.

We choose to avoid video for two reasons. With a low bandwidth connection, the quality of the video is so bad that it is impossible to see something from a slide or a blackboard on a remote computer. Secondly, using video requires the presence of a cameraman to focus the camera on the slides, whiteboard or professor. This introduces a recurring cost in manpower that is unaffordable in the long term.

For the remote student, listening to the lecture is as simple as logging on to the Internet. He must have the free streaming player installed on his computer to listen to the teacher's voice. To visualize received documents, students must use a Java-enabled Web browser. The window opened in the remote student's browser is automatically updated when a new document is received.

On-demand

During live events, the log file of the WebConf application keeps tracks of the transmitted URL's and the exact time when the HTTP request corresponding to that URL was made. The audio signal is also archived. After the course, these files are automatically synchronized by use of the SMIL language (Synchronized Multimedia Integration Language) and thanks to a set of PERL scripts.

SMIL uses a simple markup language (like HTML) to specify how and when the different media play. It is XML compliant and is recommended by the W3C consortium. A SMIL file can be created with any text editor. A SMIL file can contain audio, video, images, and text.... Figure 1 shows an example of SMIL file, as used in our project. The SMIL file starts with a <smil> tag. By use of the <par> and <seq> tags, different clips can be respectively played at the same time or in sequence. In figure 1, an audio clip is played when a sequence of slides is shown. The src attributes in the SMIL file lists the clip format and specifies its location. Clip start and clip end attributes specify the clip's internal timing mark where playback begins and ends. Here, the audio clip starts at 2.25 min as the recording had started 2.25 min before the beginning of the lecture and stops after 63.85 min. The dur attributes sets total time clip plays. Here, the first slide is on the screen during 187 sec before the second slide takes its place and so on. The file ends with the closing of all open tags.

The SMIL file and the different signals are placed on a streaming server. The Web pages giving access to the lecture are automatically created. When the student selects a link in a web page, the Web browser requests the SMIL file from the streaming server. The streaming server's response causes the Web browser to launch the player. The player then requests the SMIL file from the streaming server using RTSP. With the information in the SMIL file, the player requests and receives the streaming media clips. Students can control the presentation by use of pause, stop, play, fast forward, ... buttons.

```
<smil>
<par>
<audio src="rtsp://138.48.33.211/son.rm" clip-begin="2.25min" clip-end="63.85min"/>
<seq>
  
  
  
  
  ...
</seq>
</par>
</smil>
```

Fig. 1: SMIL file

The recording of a four-hour lecture requires a 150-Mb storage place. Lower quality recordings are also made available for downloading and only require 7 Mb/hour of storage. The use of a video camera would require storage place of at least two orders of magnitude higher. The online lectures are complementary to the classroom lectures. Examination still requires a meeting between the teacher and the student.

4. Results

The results of a two-year experiment with such a low-cost solution are very encouraging. During the pilot year, with a single classroom equipped, 120 hours of lectures were broadcast through the Internet and archived. During the second year, we equipped a second classroom and convinced more teachers to take part in the experiment. More than 250 hours have already been broadcast and archived this year. Additional 50 hours will be broadcast before the end of June 2001. The diffusion concerns 11 different courses. Selective seminars have also been broadcast. In addition to evening lectures, an optional day

course has also been recorded, allowing students from the evening lectures to study it. Examination results revealed no significant difference between students who were physically present in the classroom and those who weren't.

Most of the lectures are freely and completely available on the Web at <http://enligne.info.fundp.ac.be>. Some lectures may even be downloaded.

The lectures archived on a streaming media server for on demand lectures enable asynchronous learning: students can access the course Web site whenever and wherever convenient. The Web site <http://enligne.info.fundp.ac.be> is entirely devoted to the online lectures. Information concerning schedule, list of all lectures, directions for use, ... can be found at this address. The student gets three possibilities for asynchronously listening to the lectures. He may listen to the entire lecture. He may start the lecture wherever he wants, as each slide is separately accessible by a hyperlink. He also gets the opportunity to listen to all slides referencing a chosen subject by use of a search engine.

A survey has been conducted on the students from the evening lectures [5]. It results that students are happy with this way of broadcasting courses. They hope that the experience will be extended to most courses. We constantly adapt the offered tools to students and teacher's needs. The teacher can now start recording his course just by pushing a button. During the first phase of the project, we focused on live diffusion. But students show a clear preference for on-demand lectures as compared to live events. During the second phase, we then emphasized the storage of lectures on a server. A third phase has led to the availability of the zip version of most courses. The students indeed prefer to download the courses when possible. Students use the offered tools to listen to missed lectures, to listen to difficult parts of the course and to complete their lecture-notes. They feel less stressed and appreciate the flexibility regarding time and place constraints.

Seven professors have freely joined the experiment so far. They consider that the diffusion had little influence on their pedagogy. Before the introduction of the whiteboard tool, they considered that the lecture's preparation required more time, as they had to anticipate the student's questions by preparing more slides.

A very interesting benefit of the chosen solution is that students from all over the world, including developing countries with low bandwidth Internet connections, use it. The comments received by these students show that this low-cost solution is sufficient to allow them to follow courses given on other continents.

5. Advantages and drawbacks

Four main advantages can be brought to light. Firstly, the diffusion and the storage of the lectures just extend their flexibility and accessibility. They do not substitute to classroom lectures but are just complementary. If we refer to the traditional classification to time and place of remote teaching, as mentioned by Bör, our experiment give the students the widest possible range of opportunities for learning, as shown on figure 1 [6]. The courses are available live and on-demand, from the computer pool and from anywhere in the world.

Time	Place	Centralized	Decentralized
Synchronous		Yes (classroom lectures)	Yes (direct diffusion)
Asynchronous		Yes (computer pool)	Yes (on-demand)

Figure 2: Training availability for students

The second advantage is the facility to implement the recording and the diffusion. It does not require any additional manpower during the recordings. The low cost constitutes the third advantage. The equipment cost is mainly made of the purchase of a computer and a LCD projector. The same equipment can be used for several courses. The cost of the streaming server and its license is lower than 4.000 Euro's. The recurrent costs are made of the maintain of a streaming and of a Web servers plus the location of an Internet connection. The fourth advantage, and not the least one, is that each course can be completely

updated every year without much investment. This is of capital importance in computer science, where the state-of-the-art continuously changes.

The lack of interaction between professor and students during live events can be considered as a drawback. The students don't make use of the IRC channels. Some problems are also due to the commercial streaming software that we use.

6. Conclusions

Web-based training has a huge potential. Besides videoconferencing and costly platforms, efficient in-between solutions exist. For instance, we have implemented a way of broadcasting courses that enhances the accessibility and the affordability of Web-based training.

In our project, the slides and the teacher's voice from traditional classroom lectures are broadcast live on the Internet and are stored on servers for on-demand listening. These online lectures are offered to the students in addition to the classroom lectures. The chosen techniques are based on streaming and on a free software called WebConf. 350 hours of computer lectures have already been broadcast and are available freely on the Internet. These techniques can be easily implemented. They are accessible and affordable for the student and the teacher. All these lectures can indeed be accessed with a 28.8 kbps dial-up modem. The preparation of a broadcast lecture does not require too much extra time from the teacher, in comparison to traditional classroom teaching.

The students are very pleased with this low cost diffusion solution. Surveys on students have shown that broadcasting a course is far less important than storing a course on a server. Streaming is nice, but students prefer to download entire courses.

The used techniques are appropriate for a wide variety of classes as long as the main written support is slide. It could be especially valuable in first degree where bad noting down is accountable of many failures. The presence of online lectures would allow students to correct their lectures-notes or to listen again to the difficult parts of the courses.

More work is under way to complete the automatization of the recording live lectures and creation of the related web pages.

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POST-GRADUATION ON LITERATURE AND THE ARTS CONTEMPORARY LITERATURE AND TRANSDISCIPLINARY DIALOGUES

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Abstract

This Course aims to provide reflexions on relevant interactions between certain aspects of contemporary american, english, french, and german literatures, and other artistic fields such as architecture, cinema, photography, music or painting.

Seven seminars will focus on specific issues concerning these dialogues; for instance, «the “doppelgänger” in german literature, and in the expressionist movies,» or «Walt Whitman’s poetry and photography.»

Students will be acquainted with the way the arts tear down canonical boundaries, and open themselves to exogenous systems with autonomous structures, and traditions.

Thus, the visual dimension of our life will be focused in its multiple aspects of its impact on literature.

We have involved in this project four Professors (Phd) and two teachers with Mestrado. These Professors have been testing their programmes for several years in different post-graduation Courses:

- «Communication and Multimedia»,
- «English Studies»,
- «American Studies»

These post-graduation Courses have been taught in a more conventional dialogue with the student (in presence), but they have provided a very significant experience concerning:

- syllabus (main goals and length)
- evaluation strategies (papers, different levels of research, brief lectures)

At this point we have reached a structure composed of the following seminars, which will be taught by the following Professors:

- «Literature and the Arts», Professor Mário Avelar
- «Whitman, Melville, and the visual arts», Professor Mário Avelar
- «Contemporary French Literature and the Arts», Professor Ana Maria Nobre
- «English Cinema and Literature», Professor Maria do Céu Marques
- «Creative Writing», Professor Maria Filipa Reis
- «Music and Literature», Master Joaquim Firmino
- «The “Doppelgänger” in German Cinema and Literature», Master Gerald Bär

The first seminar mentioned above, «Literature and the Arts», will provide an introduction to the whole Course. It will start with the case study of a Portuguese major contemporary poet, Jorge the Sena, who will show the way he approaches the “ekphrasis” in his poetry.

This will lead us to the second module of the seminar and back in time to the founding place of our culture: Greece. We will see how Homer built this theme in “The Illiad”, with the Achilles’ shield. At the

same time we will focus on the theoretical issues concerning this theme through some passages of Plato, Aristotle and Longinus. At the same time we will be moving towards Rome, and namely Virgil and Horace, among others.

The third module will start with Lessing's "Laocoön" and will provide a main survey of the main debates and of the main ways of dealing with the "ekphrasis" and with the dialogue of literature with the arts, from Romanticism to contemporary poetry, focusing examples of American, English, French, German, and Portuguese Literature.

The seminar will be taught with the support of a book specifically written for this situation, which will consider the different strategies of evaluation oriented for the students.

We consider creating a Cdrom version of this book in order to reach other students and the public in general.

At the same time we will start with the other seminars in a gradual strategy.

We think that this Course may function in specific levels of research, concerning several purposes, and different audiences, depending on different strategies of approach.

ASSIGNING LEARNING VALUE TO DIGITAL RESOURCES IN INTERNET – ENABLED ENVIRONMENTS

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Introduction

Technology is an agent of change, and major technological innovations can result in entire learning paradigm shifts. Internet is one such innovation, since it does not only affect the way people communicate and do business, but also the way people learn. Consequently, a major change is applying in the way educational materials and content of any kind are designed, developed, and delivered to those who wish to learn.

The advent of networked technologies and more specifically the rise of the Internet as one of the dominant means of information gathering, diffusion and communication enables content owners and developers to reach more easily the educational community. And content owners, such as educational and cultural institutions, should aim at the end-user if they are to retain their relevance in the new millennium.

It is nowadays realized that the collections of cultural, scientific and other archival objects, in various institutions, represent a massive and under-utilised resource, and that the key to their wider use, is their digitization and their successfully (given the “audience” profile) structured documentation, in order to transform themselves from repositories of locally held materials, into gateways to licensed content in a multiplicity of formats. In this context, in order for the content to be of value to the end-users, it must be reusable, interoperable, and easily manageable at many different levels of complexity. The instructional technology called “learning objects” presents the aforementioned properties.

Learning Objects for Resource-Based Learning

The concept of “learning objects” is going to play a central role in the learning environments due to its potential for reusability, generativity, adaptability, and scalability (Hodgins, 2000; Gibbons et al. 2000).

In the literature, what we will refer to as “learning object” is termed in various ways “learning object”, “instructional object”, “educational object”, “knowledge object”, “intelligent object”, and “data object”, given the fact that there is a broad discussion on their nature and there is not yet a widely accepted definition.

According to a definition given by Wiley (2001) as “learning object” could be defined “any digital resource that can be reused to support learning”. This definition includes anything that can be delivered across the network on demand, be it on large or small. Examples of smaller reusable digital resources include digital images or photos, live or prerecorded video or audio snippets, small bits of text, animations. Examples of larger reusable digital resources include entire web pages that combine text, images and other media or applications to deliver complete experiences, such as complete instructional event.

Although “learning objects” seem to be an efficient solution, as long as they lack instructional value, we will not be able to use them effectively. From a practical and technical point, metadata standards define what data needs to be collected and stored to provide descriptive information about a “learning object”. The object’s metadata help in the organization function and make it possible to look for and re-use a knowledge object that contains desired content (the object’s data). The importance of metadata and its role in facilitating the location or discovery of learning objects is obvious. “A learning object undiscovered is a learning object unused”, let alone reused (Wiley, 1999).

A number of international Groups and Projects like ARIADNE, IMS Project, Dublin Core Education Working Group et al. are working together to define common international standards for describing “learning objects” that can be interoperable, reusable, repurposable, and effectively managed and

presented. Their common interest is to find a minimum set of metadata standards that will support the worldwide deployment of learning objects for multiple purposes.

However, “learning objects” have important embedded instructional objectives and, if we are not providing instructional information in metadata, all we have is a “content” object. The two most important instructional properties of “learning objects” could be considered reusability and granularity.

By **reusability** it is meant the ability to take a learning object as it is and reuse it wholesale. Reusability is at the core of the “learning object” notion, as all the other properties are facilitated by the possibility of reuse. A difference must be drawn between the “reusability” and the “repurposability” of learning objects. **Repurposability** refers to the ability to extract parts of a “learning object” and adapt them to new learning contexts.

Granularity is the second significant educational property of a “learning object”. IMS defines granularity as “the relative size of the resource”, which is now called *Aggregate Level* by IEEE (The Institute of Electrical and Electronics Engineers, Inc.) and is defined as “the functional size of the resource”. The question addressed by Wiley (1999) as regards this property is “What degree of granularity of learning objects best promotes the instructional use of the learning objects?”, and according to his opinion the introduction of fields conveying instructional design information (like instructional architecture and individual difference information), combined with a redefinition of granularity (“the instructional function of the resource”) could facilitate an immediately technologically implementable method of delivering education (learning process).

The *ISTOS* Functional Model

The *ISTOS* Functional Model consists in a metadata structure specifically addressing the needs of school communities in Greece, being capable of handling a variety of cultural and other “content” items, in distributed digital repositories, in such a way as to facilitate the development and supply of learning services over the Internet.

The aforementioned Model has been developed within the framework of the project *ISTOS* (Cultural Material and Educational Services on Networks). This project was mainly aiming at facilitating Greek primary schools’ access to cultural material/content through the use of Internet - based services as well making use of cultural material/content for educational purposes. The project has further linked schools up to national level via the Internet establishing a school network in order to pilot test flexible learning approaches for both students and teachers.

During the pilot phase of the project, emphasis was given primarily on the cultural material. This decision was taken in order to pilot test the possibilities of content that is not considered ad hoc as educational to be of use within traditional educational settings and open doorways to understanding other subject matters and disciplines and favor the development of interdisciplinary pedagogical approaches.

Nevertheless, it is within the aims of the *ISTOS* Initiative, to invite all the interested content providers in Greece, such as libraries, galleries, collections, creators, individuals, archives, film archives, publishing houses, educational institutions, universities, research institutes etc., to join the initiative and adopt the *ISTOS* Model, thus developing digital content repositories with learning value, accessible over the Internet, in the form of services especially addressing the school communities.

More specifically, within the goals to be achieved are:

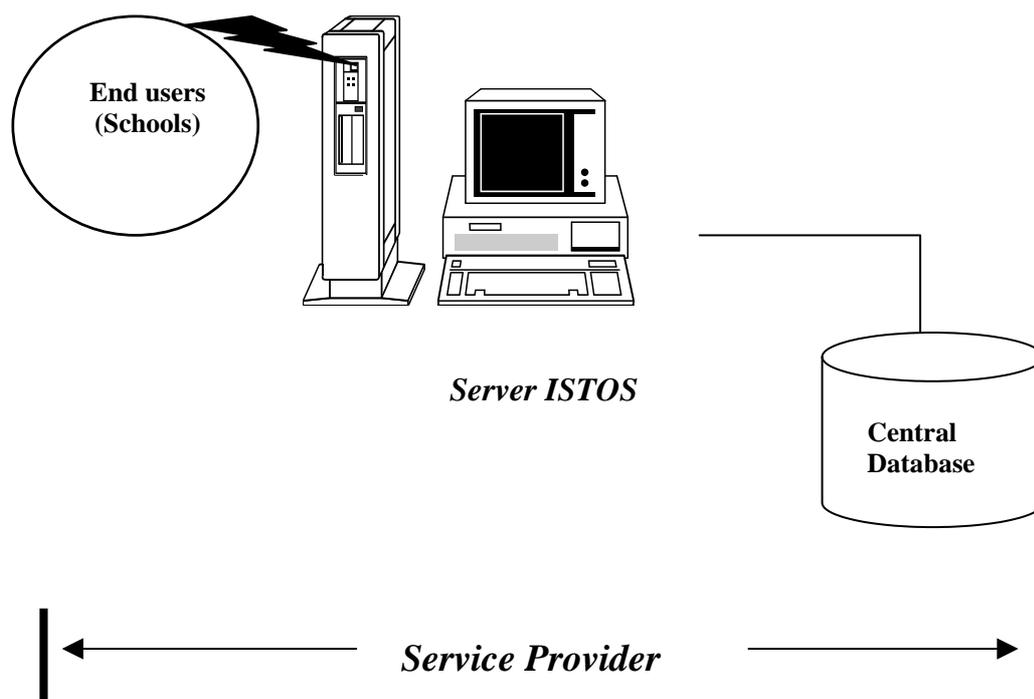
- to make educational use of the wealth of Internet resources,
- to establish strong links among school communities, individuals, cultural institutions, and other content providers,
- to make best use of cultural heritage and arts,
- to promote inquiry-based learning in order to foster control of the learner, stimulate imagination, and give pupils the opportunity to communicate their thoughts and feelings to others.

It is the pedagogical orientation of the project that necessitated the development of an innovative solution for the item description and insertion in the database, which seeks to integrate material and information of various kind in a way that meets the needs of the educational community for “smart” retrieval, collection and flexible use of the material within the educational settings. To enable this, effort has been placed on the development of a set of criteria that on the one hand describe efficiently the item (by avoiding to follow by the book the categorization adopted in each content provider), but on the other hand enable users to interconnect the database items according to their needs, interests and different contexts of use.

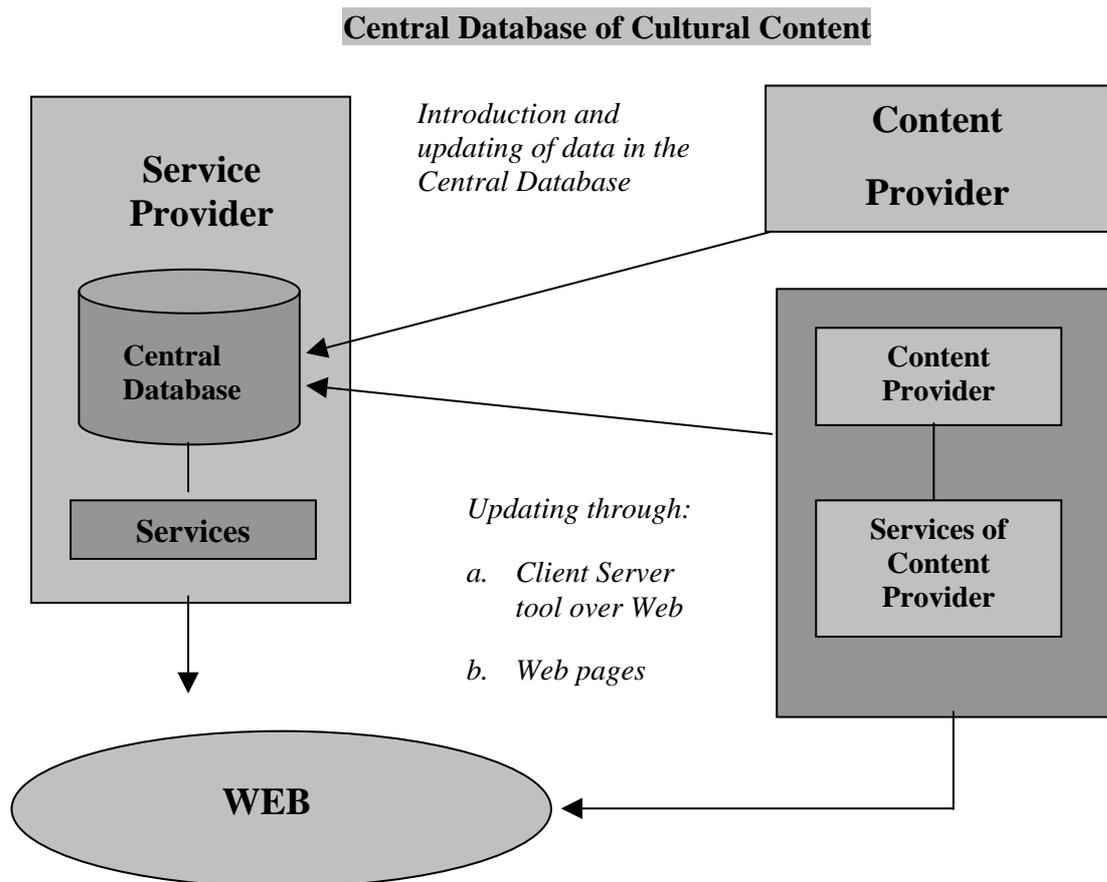
The specific metadata structure has been implemented in three stages:

- Specification of the criteria according to which the items should be documented and introduced in the database by the content providers as well as the educational service providers.
- Specification of the categories of users as well as the retrieval criteria.
- Description of the retrieval interface and the interface for the results presentation.

According to the system architecture there is one Central database containing the material provided by all partners and hosted by the Educational Service Provider, whereas each organization has its own database which should be compatible with the Central but includes only its own material. Schools will have access to the Database through the *ISTOS* server, as it can be seen in the diagram.



As regards the communication between the Content and Service providers the following scheme has been adopted:



The Model has been developed in order to provide the various “content” owners and/or administrators with a widely accepted structure to organize their content collections so as to assign learning value to them; thus, increase their usability, reusability and adaptability.

The flexibility of this “database” to incorporate digitized content of all kinds and from different sources is merely based on a meta-data structure developed by the project and adopted by all the partners involved. This metadata structure has been based on the other existing, established metadata sets (such as Dublin Metadata Core Element Set, Categories for the Description of Works of Arts developed by the Art Information Task Force, IAFA templates, Van Eyck project, Visual Resources Association Core Record, SPECTRUM system) making further provisions for metadata elements which support the use of the “database” for the provision of on-line learning services in the school settings. ISTOS Model aimed at the development of a metadata structure that is not domain specific (museum records are different in structure and “vocabulary” from archive records, for example) and it is user-oriented (they are not intended for staff or specialist researchers, but for the public).

The main categories for description are organized around the *item* and the *creator*. The item is assigned the following “attributes”:

- *Type of material*
- *Title*
- *Subject*
- *Description*
- *Version*
- *Code number*

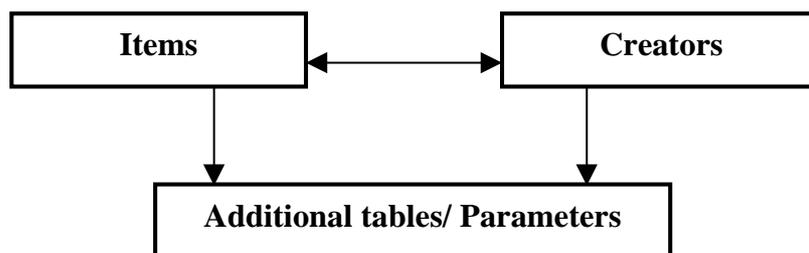
- *Language*
- *Copyrights*
- *Physical description*
- *Time as well as place of creation*
- *Time and places that is referred to*
- *Relationship to other resources.*

The items included in the database, themselves, have no absolute or inherent educational value related to a specific course or part of the curriculum. They are discrete. The discrete materials are the key, timeless resources capable of re-use and re-purposing. However, a set of criteria which refer to the educational context of use of the item are included and the possibility to serve an educational purpose - by being articulated into other items or resources- is given.

As regards the creator, the main “attributes” are:

- *Birth place*
- *Birth date*
- *Main influences*

So, the scheme to be followed in the database is:



The main retrieval categories are:

- *Title of the item*
- *Creator*
- *Category of material*
- *Date of creation, cultural*
- *Place of creation*
- *Cultural movement*
- *Place and time that is referred to*
- *Appropriate age level*
- *Subject matter*
- *Key words.*

The ISTOS model combines three design components: *resources* [both static (e.g. textbooks) and dynamic (e.g. web-based resources)], *contexts*, *tools*, whereas a fourth (i.e. scaffolds) is on the way to be developed. By *context* we refer to the settings, real and virtual, in which learning and/or performing circumstances are framed. ISTOS enables both externally directed and learner generated approaches. *Tools* are critical to locating, assessing, and manipulating the need resources, as well as interpreting and

evaluating the usefulness of the resources. For the moment, ISTOS provides searching tools, whereas communication tools are going to be introduced. As regards, *scaffolds*, the model helps scaffold the organization in limited ways, permitting key word searches, as well as presentation of various views of content through linking relevant pictures and text notes. Within the key assumptions of the formative evaluation of the ISTOS metadata structure is the further development of two of the four components: tools and scaffolds.

Concluding Remarks

ISTOS Functional Model is a tailored “metadata structure” to address the learning needs of Greek School Communities. The Model is supposed to facilitate the joint activities of cultural and educational institutions to use and reuse digitized content, in order to provide Internet-enabled learning.

The specific ISTOS metadata structure has already proven its capability of handling various content formats, independently of origin, nature, type, etc., but it has not proven yet its capacity to facilitate really useful learning services for the school communities.

According to the results of the evaluation of the ISTOS metadata structure, during the pilot phase of the project, four requirements should be taken into account in order to develop a database containing digital resources with learning value:

- Emphasis should be given in the systematic control and filtering of the metadata elements.
- Each item in the database should be related to lesson plans, presentations, and classrooms activities in order for the user to get an idea of how it could be used within an educational context.
- Various tools and services (i.e.tools) should be provided in order to give the possibility to the users to contribute their own information and “build” their own scenaria (i.e.scaffolds).
- A collaboration of content owners with educational institutions is necessitated since in several cases the content owners do not have the expertise or even motivation to link the items to the school curriculum.

Finally, the ISTOS Initiative is aiming at facilitating the wider adoption of the Model by the content owners, thus increasing the Greek content (cultural, scientific etc.) over the Internet and upgrading the learning experience provided online.

More information can be found at the *ISTOS* web site : <http://www.istos.lrf.gr>.

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EXEMPLARY-BASED LEARNING: A NEW WAY OF WEB-BASED TRAINING

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Introduction

In many fields the developments are so fast that the need for life long learning increases fast. In some fields, the knowledge or skills people learned five years ago are not valuable anymore. And that will be no exception in the future. Therefore, it is no surprise that companies look for more efficient and effective forms of learning for their employees. In this paper a new learning model is presented that is developed in the framework of the European project CODEX-IP.

In April 2000 the European project *Collaborative language independent development environment for exemplary based re-usable learning objects in IP learning platforms* (CODEX-IP) started. A consortium of nine companies and institutes from different European countries deploy Research and Technology Development activities to create:

- An innovative learning model: exemplary-based learning (EBL);
- A methodology to structure web-based courses derived from the new learning model;
- A (blueprint for a) new development process for the collaborative development of re-usable learning objects between training centres in different language areas;
- A completely new integrated development environment based on the new learning model and development methodology.

In CODEX-IP the following three building blocks will be developed and integrated: (1) an authoring tool to support all phases in the development process, (2) a common database (structure) to store and retrieve re-usable learning objects and modules and (3) a Memory Based Translation Engine. It will support the identification and development of re-usable learning objects and modules in a multinational and multilingual environment. Training centres use the environment for application trainings for employees of companies. In the first year the SCO-Kohnstamm Instituut focussed on two activities regarding instructional design and exemplary-based learning: a literature study and pilot studies in the Netherlands and Spain in which principles for exemplary-based learning are tested.

Literature study

The starting idea of the project was to give examples an important role in application training (for instance, a MS Word training). A literature study was done to map trends in corporate training, with a focus on e-learning and different learning models related to learning via examples. For EBL, the learning models of traditional apprenticeship and cognitive apprenticeship functioned as inspiration. The traditional apprenticeship model was the common learning model in the Middle Ages: the master showed his apprentices a perfect example as outcome of his skills, allowing them to watch the procedures necessary for creating this product, and gave them the assignment of copying his procedures as well as possible, in order to produce a product as perfect possible. This learning still takes place when we ask others to show how to do something (e.g. on a computer).

The use of digital learning environments is a trend in companies and higher education because of the advantages of just-in-time, just-in-place and just-enough learning. The concept 'powerful learning environment' of De Corte (1990) is inspired by cognitive apprenticeship (Collins, Brown & Newman, 1989). This concept consists of four dimensions: content, methods, sequence and context. Each of these dimensions has elements that can be used to make digital learning environments more powerful, for example the element 'modelling'. Modelling is described as 'experts perform tasks that students observe and imitate to form a mental model of the activities necessary to perform the task'. Examples of other

elements that can enhance learning are coaching, scaffolding, fading, heuristics, learning strategies and increasing complexity.

Nowadays shifts become visible in perspectives and beliefs about learning. An important shift is for instance the shift from instructor centric learning to learner centric learning. The shift from instructor-centred to learner-centred implies changes in objective, type, emphasis and organisation of corporate training. Also, training is now more focused on corporate performance. In this framework computer based training is seen as a part of the support system of an organisation. Although in computer based training itself the emphasis is put on the learner, the emphasis of the organisation as a whole is put on performance. Table 1 (Hodgins, 2000) gives an overview of these shifts.

Table. 1. Learning today, learning tomorrow (Hodgins, 2000)

Today	Tomorrow
Technology training	Performance improvement
Classes for the masses	Personalised learning
Sage on the stage	Guide on the side
Instructor centric	Learner centric
Training when scheduled	Learning on demand
Time to train	Time to perform
Teaching by telling	Learning by doing
Subject-based learning	Project-based learning
Learning to work technology	Putting technology to work
Know-what	Know-why
Basics = 3R's (reading, writing, arithmetic)	Basics = Higher order thinking
Skills & Information mastery	Inquiry, discovery & Knowledge
Re-active	Pro-active

What is an example?

In the EBL model examples play a key role. But what do we mean by examples? We distinguished three types of examples:

- Examples of concepts;
- Examples of results of a process;
- Examples that show how to make a product (demonstration of a procedure).

Examples of concepts are those examples that show objects or representations 'as they are'. There is no intrinsic connection to the process that created the objects. The objects function in a more complex context as illustration. The connection to learning tasks is mostly implemented via elaboration or explanation of the concept and/or object. An example of this type can be an image of a keyboard that shows the keyboard as it is, with some text or other cues to explain its parts or functions. In the context of a Word 2000 training it can help the end-user to understand what 'indentation' is by presenting a visual presentation of a paragraph with indentation.

Examples of results of a process are objects as well, but they are connected to the process that created them. The place in the conceptual network structure of this type of example is to trigger and support learning. The triggering question is: how does the product look like?

An example of a result thus functions as a:

- Learning objective, it shows the learner what can be learnt via the instruction;
- Demonstration of a result, it shows what the learner can do or make;
- Anchor, to help the learner connect new information to his cognitive structure;
- Navigation element, it helps the learner to go to the topic he wants.

An example of a result includes a title, a visual presentation of a typical result with all the important attributes and a sentence for clarification.

Examples that show how to make a product (demonstration of a procedure) help the end-user to understand the exact procedures that are necessary to make a product. How does one create the product?

First EBL-guidelines

After this literature study the first guidelines for EBL instructional design were formulated:

- Examples of results of a process function as learning objectives;
- The end-user is responsible for choosing one's own learning path based on the available examples of results of a process (to support learning on demand, and learning centric training);
- Content parts are as independent as possible (to support learning on demand);
- Examples of results of a process are taken from a realistic context for the end-user (to anchor instruction and to make the instruction relevant for the end-user).

An example of results of a process functions as a:

- Learning objective, it shows the learner what can be learnt via the instruction;
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An example of a result includes a title, a visual presentation of a typical result with all the important attributes and a sentence for clarification.

At the same time a demonstration of a process can function as an example as well, which is related to the master-apprenticeship idea.

Pilot studies

The goal for the pilot studies was to gather information and suggestions about the first EBL ideas for instructional design. In total 24 people tried out a web-based Word 2000 training on "Paragraph formatting", 10 persons from the Netherlands, and 14 persons from Spain. They had a different background (e.g. sales, administrative, catering, courseware development) and a diverse level of Word knowledge and skills. The environment consisted of eight topics like: tab settings, paragraph style and borders. Every topic contained four elements:

- An visual example (like figure 1);
- List of procedures to make the example;
- Extra information about the topic;
- An exercise.

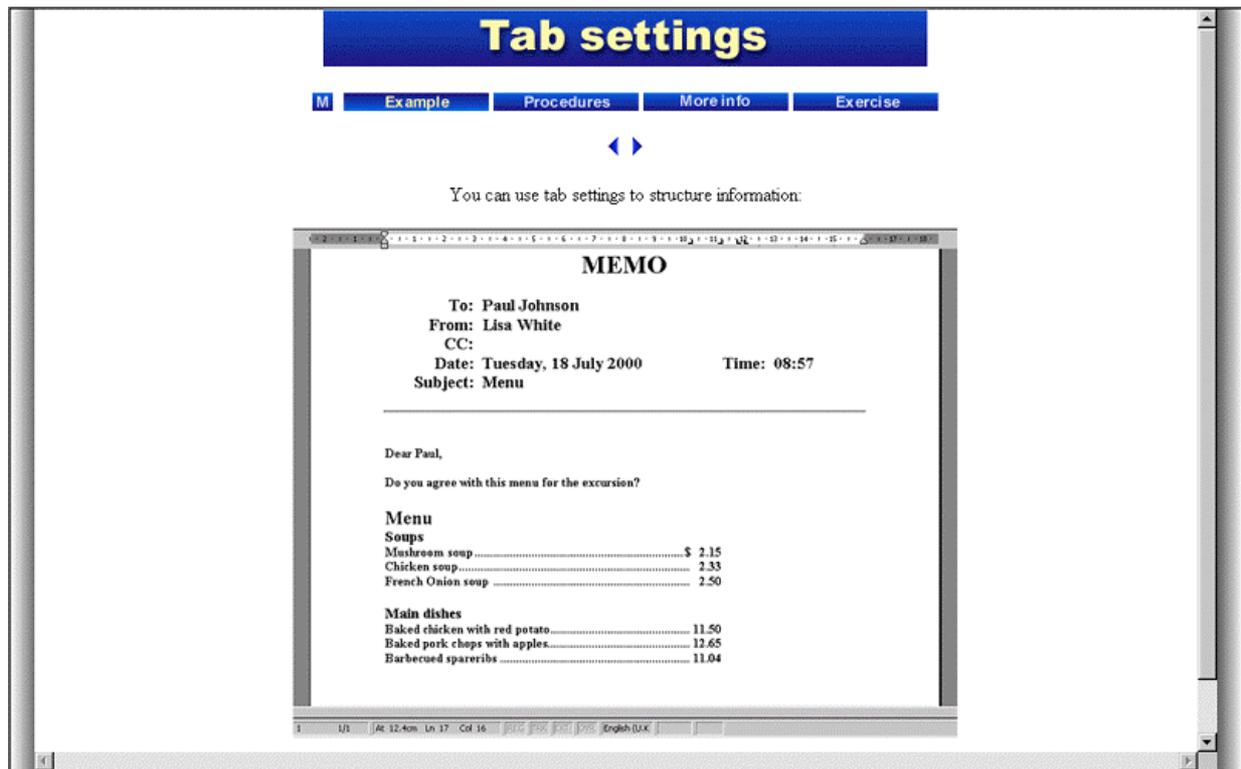


Figure 1. Example for the topic 'Tab settings'

The persons worked for 60-90 minutes with the learning environment, did a small test, filled out a questionnaire and were interviewed about this questionnaire afterwards.

Although the trial groups were small, it seems that the persons with a high level of Word knowledge and skills preferred short instructions (procedures) for carrying out a task. Users with a low level of Word knowledge tend to prefer step-by-step exercises in which they are more guided by carrying out a task in Word 2000. Due to their prior knowledge they have more difficulties with understanding the steps in the procedures. They had a need for step-by-step exercises but also for the more 'do-it-on-my-own' exercises in which the learner can test whether or not he/she understands a procedure. It was helpful for the trial group to have first an example of the result of a task because they could see first what they could learn in a section.

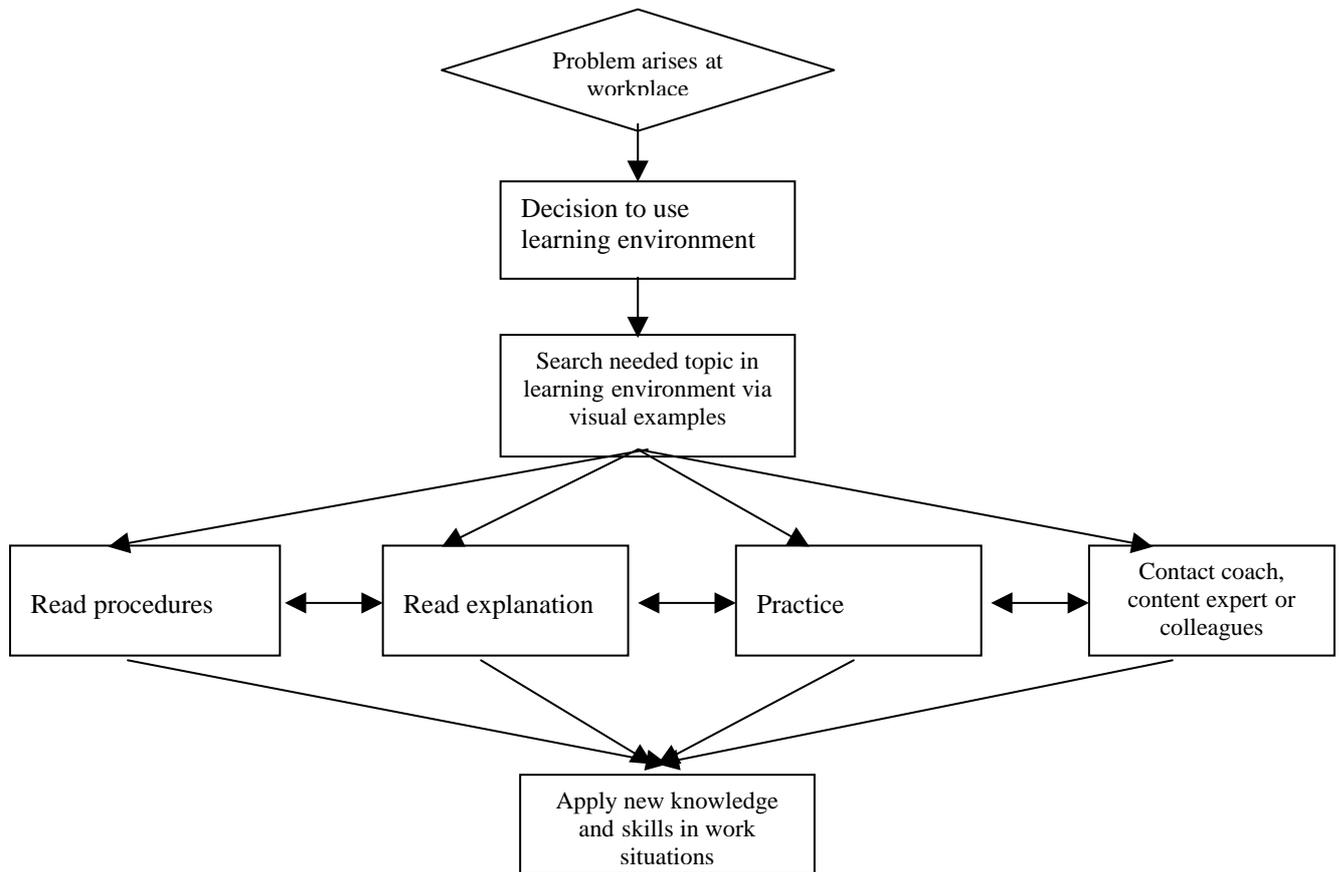


Figure 2. Process of working in EBL-environment

Working with the learning environment

Figure 2 shows the process of working with the learning environment in an on-the-job situation. It starts with a problem at the workplace (e.g. the learner doesn't know how to make a footnote). The learner can choose to read the (short) procedures to carry out a task, to read more about these procedures (read explanation), to practice and/or to contact others to help by a problem at the workplace.

Elements for an EBL-learning environment

From the trials we concluded that elements for an EBL training can be:

- Overview of the content of the course (both graphical and textual)
- Examples of results of processes
- Description of procedures (short instructions)
- Demonstration of procedures (which can be an animation or video)
- Prior, extra and related information
- Guided exercises
- Exercises which can function as self-tests

Because the different parts of a programme should be worked through in the order the end-user prefers, the content should be as independent as possible.

Several aspects are important to make an EBL-course a success:

- Content must fit the prior knowledge of the end-users;

- Explanation must be provided about the role of the different elements in the learning environment, especially about the role of examples;
- Examples must be clear and come from a realistic context, recognizable for the learner (preferably from the work environment of the learners);
- Content and examples must be relevant for the end-user;
- Support from a coach (and other) is needed to help the learner in his learning process (tips for learning, decisions about learning path).
- The programme should provide enough variation in presentation formats and exercises;
- Feedback should be incorporated into the programme;
- Examples must give a clear idea of what the user can obtain by learning the example. It should have a guiding role;
- There should be ample opportunity to practice procedures on different levels and to check if users know them by heart;
- Enhance the usability of the examples, adding animations of procedures will be useful;
- Exercises should be as similar to reality as possible.

EBL-Parameters

To characterize EBL 19 parameters were formulated in a total of four categories: organisational aspects, process of learning and teaching/training, content related aspects, and technological aspects. They describe the limits of the concepts, and of its context. Four EBL-parameters are described here:

EDUC 2	Trainer directed	$\tau \text{-----X-----} \nu$	Self directed
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Trainer-directed means that the trainer is the actor who makes decisions about the learning process. He decides which content is necessary to learn, he explains it in a structured way to the learner, makes a planning for studying the content and the learning activities, etc. In self-directed learning the learner makes his own decisions, works with material that is self-instructed; a coach can support the learner in his learning process, for instance, by helping to identify learning needs and translating these learning needs to a learning path. He can provide the necessary facilities, and help the learner when he has questions. EBL is in principle self-directed. But flexibility is possible here. For example, a face-to-face meeting can have a motivating influence on the learner. And especially when a user just starts to learn within a new domain he may like the idea of immediate and in-real-life feedback.

EDUC 5	Modelling	$\tau \text{X-----} \nu$	Discovery-experimentation
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This dimension focuses on how tasks and skills are learnt. Both use the strategy 'learning by doing' but with a different accent. For modelling an expert shows how to carry out a task. The learner observes and tries to imitate the expert. In experimentation the learner doesn't know exactly how to carry out a task. He tries out and draws conclusions. Variations in support from a coach are possible in both modelling and experimentation, depending on the learner and the phase of the learning process. In EBL the focus is on modelling. After the learner finds the example, which represents the problem, it is shown how to solve it. Exact steps are given by providing the procedures. Step-by-step exercises help the learner to carry out the task without problems. For complex skills, the developer and coach must carefully look to the level of performance of the learner. It is most likely that a novice needs support in understanding complex models of problems solving. Probably the model is divided in smaller units, or first more simple tasks are learned before the complexity is increased.

EDUC 6	Reproduction	$\tau \text{-----X} \nu$	Performance
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Reproduction and performance are results of learning and closely related to declarative knowledge and procedural knowledge. Is the training focussed on knowing the meaning of the icons of Word toolbars (reproduction) or on making a bulleted list (performance)? EBL is focused on performance. The objective of an EBL-environment is that learners can carry out specific tasks. For a novice learner in the domain a variety of exercises can help to show the required performance. These exercises can be presented using a step-by-step guidance or in a more difficult way in which the learner must make decisions himself ('which command do I use for...').

CON 5	Declarative knowledge	τ -----X----- ν	Procedural knowledge
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Declarative knowledge and procedural knowledge are focussed on the type of content of the training. Declarative knowledge is about facts and concepts. An example of a question on declarative knowledge is: What does the concept 'caption' mean in Word? Procedural knowledge is about 'knowing how to do something'. An example of a question on procedural knowledge is: What are the steps to number tables automatically?

EBL is focussed on procedural knowledge, but to avoid the problem that the learner has a fragmented mental model of the application, attention for declarative knowledge is necessary as well.

In EBL, this combination is implemented by providing explanations of the procedures, extra information and (hyperlinks to) related information. It will make clear why certain procedures are chosen.

To test the EBL guidelines and parameters in-depth two web-based trainings will be developed in the second year of this project: an extensive Word 2000 training and a Dreamweaver training. These trainings will be available in different languages, which means we can test with larger groups of users in several European countries. The examples used in these trainings will be designed especially for two involved companies. Often companies have their own demands for documents (letters, reports etc.) the employees produce. Information about the layout and company specific demands for the documents as well as input from the managers and the learners will be the basis for the development of examples, which are as realistic as possible for the employees.

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THE INTERACTIVE VIRTUAL CLASSROOM FOR DISTANCE LEARNING: REFLECTIONS AND PRACTICAL SOLUTIONS FROM A FIELD STUDY

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1. Introduction

The third generation of distance learning models is based on the creation of a learning community in which a strong interactivity among participants (between teacher and learners and among learners) is allowed (see for instance [1]).

In particular the potentialities of information and communication technologies in distance learning concern two main dimensions of learning:

- a social dimension regarding interaction between teacher and learners as well as among learners (e.g. on line learning situations);
- an individual dimension consisting in the ability to support learners' and teachers' access to the information sources (e.g. web based learning situations).

With regard to the social dimension, the developments of information and communication technologies give the opportunity to realise interactive virtual classroom situations in which geographically distributed people (users) are involved in a learning/teaching real time process using multimedia systems. By the integration of video communication with personal computer facilities, these systems provide the following main functionality:

- the utilisation by the teacher of a multimedia chair with the facilities to handle educational aids, e.g. slides, transparencies, video recorded materials, computer based training tools, etc.;
- real time communication among several remote locations using different media to present information: speech, music, text and drawings, still images, full motion images, etc. This permits a rich kind of communication between the teacher and the learners and as well as among learners: for instance it is possible, to convey messages using non verbal communication (gestures, tone-of-voice, posture, eye contact), to obtain visual feedback in real time and to process and edit a multimedia document within a group (collaborative editing).

A lot of experience has been developed about web based learning situations in which the main role of the technology is to provide access to the information needed for learning. In these situations e-mail, computer conferencing, etc. may be included to provide interactivity among participants (see for instance [2]). Few experiences have been developed about the utilisation in the field of interactive virtual classroom in which real time communication is allowed using audio, video and text communication (see for instance Papa & Spedaletti in press).

One of the main opportunities provided by these kinds of interactive virtual classroom is the possibility for the teacher to utilise the cooperative learning methodologies in which interaction among learners is of fundamental importance [3]. Some recent research developments in the tele-education field make evident that a correct use of these innovative methodologies could improve learner's performance and learning climate [4, 5]. Moreover some studies (see for instance [1]) suggest that highly interactive distance learning is best suited to contribute significantly to learners satisfaction or achievement. Less interactive distance learning situations seem to be less adequate to engender student satisfaction or achievement.

In order to investigate the utilisation of interactive virtual classroom in the last years human factors investigations [6] were developed at Fondazione Ugo Bordoni (FUB) both in laboratory and in the field. In particular, a field experiment was realised in cooperation with RAI (Italian Public TV) within the CRABS (Cellular Radio Access for Broadband Services) Project of the ACTS Program funded by the EU.

In the present paper the main operational results and practical solutions coming from the CRABS field experiment are summarised. Furthermore the experience is reflected upon and the topics that need further investigation are discussed. The main aim is to show some key issues that came out the field experiment, to discuss them taking into account they are not rules to be followed but suggestions based on our experience.

2. The CRABS field experiment

A virtual classroom situation was realised in the field using a multimedia system. Four different remote sites in Rome were connected. The teacher was placed in the human factors laboratory at FUB, the learners were placed at three different sites at RAI premises. Two learners were present in each learner site.

To provide high interactivity between teacher and learners and among learners, a radio telecommunication system using a 40 GHz cell and a 2 Mbit/s return channel for each remote location was utilised [7, 8]. The multimedia system allowed audio, video interaction and document processing in real time.

The general objective of the investigation was to experiment with cellular broadband systems in realising virtual classroom situations. In particular learners' performance, learners' satisfaction about the lesson and usability aspects of the multimedia system in terms of ease of use, usefulness, telepresence, users' satisfaction about the system were investigated.

The experiment was composed by different experimental sessions [9]. For each session the teacher gave a lesson (duration approximated to one hour) using cooperative learning methodologies. The topic of the lesson was "Data exchange between Word and the Excel". A sample of RAI employees (N=54, 27 males and 27 females) took part in the experiment as learners. Data about the learners' performance were collected by the same test administered before and after the lesson (pre- and post-test). Data about system usability were collected by questionnaire.

The main results indicated that the audio/video quality was evaluated under a good standard. In fact, the learners detected relevant disturbances on images and voice of the participants. However these disturbances were not influencing the lesson evaluation, the system usability and the learners' performance which got very positive results for this particular environment, for this particular learning task and with this particular kind of users, according to the results of other investigations (see for instance [10]).

3. Operational results and practical solutions coming from the CRABS field experiment

From the whole results of the experiment some tools, related to both educational aspects and experimental topics were obtained. These tools are summarised in the following. Furthermore the basic requirements of the multimedia system configuration in order to maximise system usability by the users were obtained. They are described in [8].

3.1 Tools concerning educational issues

In order to realise successfully interactive virtual classroom, a procedure for training teachers and a procedure for training learners were obtained.

Procedure for training teachers

The use of multimedia systems implies some changes in the ways usually adopted by the teachers in designing and in delivering lessons. Moreover the virtual classroom situation implies new skills for the teacher; for instance the teacher should be able to deliver the lesson in front of a camera. In order to face these problems an adequate training procedure was adopted [11].

In comparison to the procedures identified in previous experiments [12] this procedure is specially oriented for training of teachers operating in interactive virtual classroom situations. In these situations, relationships among learners are of fundamental importance (co-operative learning situations). Then the previous procedures have been extended in order to provide the teacher with adequate indications for promoting and managing the communication in the virtual classroom.

The above extension is summarised in the following:

- providing the teacher with advice and indications about delivering the lesson (setting up practical exercises and simulations) with particular attention to:
 - a) the modalities to start the lesson with the main aim to set up a learning climate to promote learning; they include:
 - to clarify objectives of the lesson, contents development, the timing, the didactic methodology;
 - to stress the relation among the lesson contents, learners' previous experience and future use of the lessons' contents by the learners in the personal work activities;
 - to define the protocols of communication among the teacher and learners and among learners;
 - to define the different roles involved in the lesson (e.g. teacher, learners, technician);
 - to introduce people each other;
 - b) the management of the communication during the lesson including:
 - to promote and to manage interactions among learners;
 - to pay attention to verbal and non verbal cues coming from learners;
 - to use a simple and appropriate language giving explanations of the technical terms;
 - to use correctly the questions: asking questions to learners and turning learners' questions to the other learners;
 - to provide the learners with the necessary time to learn e.g. using redundancy, repeating more times the same concepts using different words.
 - c) the conclusion of the lesson, summarising the most important concepts with learners' involvement.
- providing written indications to summarise the above principal points;
- setting up preliminary trials involving learners to verify the practical use of the above indications by the teacher.

After the use of the above procedure an expert in educational methodologies using the observation technique evaluated the teacher's performance. The same expert provided some feedback to the teacher after each preliminary trial, and discussed with the teacher the problems encountered and the ways to solve them.

Procedure for training learners

In interactive virtual classroom situations the high number of functions made available to the learners may increase the complexity of the system. As a consequence an important aspect is the identification of adequate procedures for training learners in the equipment use. Moreover these procedures should provide the learners with indications about the behaviour and the protocols of communication to be followed in the virtual classroom.

The main objective of the adopted procedure for training learners [11] was to provide them with the necessary skills to use correctly the system. Indeed, the procedure has been built up to make the learners believe they can master the multimedia system, that is, to increase their self-efficacy. In a previous study we found some evidence that if the learners think that they are able to master the distance learning system, their performance improves; on the contrary, if they think they are not able to do it, their performance deteriorates. Thus, it is important to take into account of this topic to obtain a higher learning performance [13].

3.2 Tools concerning experimental issues

One of the main features of this field study was that subjects (learners) were distributed in different remote sites and interacted in real time. In this situation it was necessary to have available at least one person adequately trained (experimental co-ordinator) for each remote experimental site.

The role of experimental co-ordinators in this kind of experiment was very important since they had the task to interact with the subjects: to motivate the subjects to carefully compile the questionnaires and the tests; to explain the objectives of the project and of the experiment; to explain the experimental task to be performed; to train the learners in the use of the equipment utilising an adequate procedure; to administer the tests and questionnaires; to provide the user with any kind of support; to prepare learners workplace before the session and to intervene in any case of equipment failure in each site.

During the experiment an adequate procedure for training experimental co-ordinators [6] was adopted. This procedure was developed with the main aim to assure that all subjects were in a similar situation during the field trial (see for instance [14]).

The comments of experimental co-ordinators, the learners' comments, the successful development of the experimental sessions and the results concerning the learners' training evaluation [9] suggest that this procedure was very effective during the experiment. Further the subjects were happy with the experience and would like to be involved in future experiments.

4. Reflections from the field study and hypotheses for future field experiments

This field investigation should be considered only as a first step towards the investigation of usability aspects, learners' performance and learners' satisfaction about lessons in more realistic field situations in which interactive virtual classroom should be applied in distance learning at the operational level.

In these more realistic situations some key issues should be investigated and extended; they are summarised in the following.

- Different kinds of heterogeneous learners' workplaces could be involved in the virtual classroom: individual workplace (for one or two learners), workplace for a medium number of learners (e.g. up to ten learners), workplace for a high number of learners (e. g. more than ten learners). Relevant features of these kinds of enlarged virtual classroom situations are the number of the workplaces and the number of remote locations (more than four) simultaneously connected in real time. In fact these features could produce relevant changes in the basic characteristics of the system configuration: for instance the video continuous presence [9] for the teacher could not be opportune owing to the cognitive overload for the teacher.
- In enlarged virtual classroom situations a local tutor is needed for each remote location, in general when a medium or a high number of learners is involved. The main task of the local tutor is to co-ordinate communication with remote locations, to provide support to the learners concerning the contents of the lesson, to provide technical aids, to perform learners' training, and so on. In detail the task of local tutor has to be defined according to the teacher considering the objectives, the target of the users and the specific setting.
- In order to evaluate the opportunities and the drawbacks offered by information and communication technologies, the future investigation should focus on the use of this technology over a longer period of time than a lesson lasting just an hour (e.g. the use during a training course). In this case a very important issue is to integrate in an adequate way different learning modalities considering the objectives, the target of the users and the specific setting. For instance face-to face sessions, individual learning, e-mail, computer conference sessions and interactive virtual classroom should be adequately integrated in a course.
- The influence of the constraints arising from the telecommunication system (e.g. audio/video quality) on learners' performance and on system usability should be investigated in the field for different learning environments (e.g. medical field, humanities field), for different learning tasks (e.g. teacher explanations, individual exercises, group work), for users performing different kinds of activity (e.g.

managers/students) and with different individual characteristics (e.g. positive/negative attitude towards distance learning, different age ranges).

- In the CRABS interactive virtual classroom field experiment a rich communication based on a full interactivity is allowed between teacher and learners and among learners. In distance learning at the operational level often some technological constraints could be found. For instance only text based communication could be possible. In order to overcome such constraints the role of the teacher is fundamental in creating the feelings of learning communities and social presence; in the planning, the development and the revision of the lesson, and so on [2]. As consequence, the above procedure for training teachers should be adequately adapted.

In summary further field investigations in real distance learning settings should be performed in the future considering:

- the utilisation of multimedia systems in enlarged virtual classroom situations when more than four remote locations with different kinds of learners' workplaces are involved;
- the utilisation of these kinds of systems over a longer period of time;
- the utilisation of these kinds of systems in different learning environments, for different type of users, and for different learning tasks.

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HEURISTICALLY EVALUATING DISTANCE LEARNING WEB-SITES

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Abstract

In this paper we discuss the application of the “heuristic evaluation” method in the Web, and especially its application in the case of Open and Distance Learning environments.

Firstly, we describe the method in brief. It is an expert-based interface evaluation method. That is to say that HCI (Human-Computer Interaction) experts are asked to judge the interface, based on a list of widely agreed criteria, known as “heuristics”. Accordingly, we describe the adaptation of this method, made by the authors and by other studies, for the Web. Secondly we focus our research on the adaptation of the method for the evaluation of Web-based ODL environments, as there is very little evidence worldwide on this topic. Obviously we had to take into consideration the certain criteria concerning the ODL environments, as well as those of the web-adapted heuristic methodology. The authors suggested an extended list of heuristics, which almost thoroughly covered this topic and it is proposed in the relative literature for ODL environments of the second generation. Consequently, evaluators have been involved in performing the evaluation of an active ODL web-site in order to assess the accuracy of our thesis.

The results of our research have shown that the method can actually be applied to the evaluation of ODL environments as well, yet some modifications are necessary, mainly regarding the expertise of the evaluators involved and the form of the ODL-heuristic list. These issues are discussed in detail. Finally, we propose some questions for further research.

Introduction

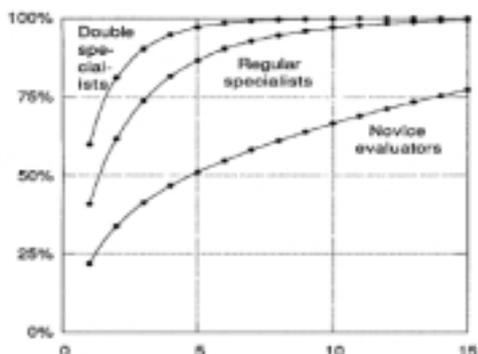
Maybe the most frequently encountered evaluation method, of any entity, is the provision of a list of criteria (heuristics) relative to this entity followed by questioning in order to express peoples’ opinion. These people can be users or experts on the particular domain. So we distinguish between user-based evaluations, known as “empirical evaluations” and expert-based evaluations. At this point we have to make some clarifications about the notion of the user. Referring to the web we consider de facto that all involved persons are at the same time users, even if they deal with it as evaluators. So we can argue that it is about an expert-based evaluation approach, even if users are involved, as long as they are concerned about answering according to the set heuristics. However, a number of problems arise from this approach.

- It provides all the disadvantages of the expert-based evaluations (Karat et al., 1992; Nielsen, 1993a; Karoulis et al., 2000b).
- The criteria list may become very long (Lewis & Rieman, 1994; Nielsen, 1993a). For example, the full interface usability criteria list suggested by Smith & Mosier (1986) includes 944 criteria.
- The evaluators' expertise plays a major role. (Lewis & Rieman, 1994; Nielsen, 1993b).

The Heuristic Evaluation

To handle these problems Jacob Nielsen and Rolf Molich started their research in 1988 and in 1990 they presented the “heuristic evaluation” (Nielsen & Molich, 1990). The basic point was the reduction of the heuristics set to just a few, at the same time being broadly applicable and generally agreed; simultaneously augmenting the evaluators' expertise, and consequently their reliability. The method refers mainly to human-computer interface evaluation, yet a number of studies (Nielsen & Norman, 2000; Instone, 1997; Levi & Conrad, 1996) has proven its easy adaptability to the evaluation of web sites as well. This study belongs to this category. The appropriate number of evaluators and their expertise are an issue of great importance. Researches by up to now (Nielsen & Molich, 1990; Nielsen, 1992; Nielsen, 1993b) have shown that:

1. *Simple or novice evaluators*. They do not perform very well. We need 15 evaluators to find out 75% of the heuristically identifiable problems. These are problems that heuristic evaluation can point out. As already mentioned and for different reasons, there are problems that are overlooked using this kind of evaluation. The research has shown that 5 of these simple evaluators can pinpoint only 50% of the total problems.
2. *HCI experts (regular specialists)*. They perform significantly better: 3 to 5 of such evaluators can point out 75% of the heuristically identifiable problems and among them all major problems of the interface.



3. *Double experts (specialists)*. These are HCI experts with additional expertise on the subject matter, eg. educators for educational interfaces. The research has shown that 2-3 of them can point out the same percentage as the HCI experts.

It is obvious that there is no great difference between experts and double experts to seeking the involvement of the latter in the evaluation. However, there is a very distinct difference between experts and simple evaluators as well. As we can see in the figure, to point out 75% of the heuristically identifiable problems we need 15 simple evaluators, while 3 expert evaluators bring the same result.

Adaptation to the Web

Evaluation in the web differs from the traditional evaluation methodologies in many ways, due to the particularities of the web: every web site is an information space with non-linear structure, so two parameters, the download time and the ease of navigation, are of great importance. In addition to this, the evaluation procedure can be conducted by every evaluator on his/her own, redefining the notion of the "evaluation session" and introducing the notion of the "asynchronous evaluation", since the evaluators can perform their work from different places and at different time. Finally, in the web every evaluator is at the same time a user. Norman (2000) presents, for example, a cognitive walkthrough (Wharton et al., 1992; Lewis et al., 1990; Karoulis et al, 2000) performed in the web, playing the role of the simple user and thus proving the efficiency of this combination. This particular occurrence by its own adds to the expert based evaluations in the web the hue of the empirical evaluation as well, augmenting its reliability, since the combination of user based and expert based approaches seems to provide maybe the best results (Karat et al., 1992; Karoulis & Pombortsis, 2000; Karoulis et al., 2000b). The adaptation of the heuristic evaluation in the web has been already studied by researchers (eg. Instone, 1997; Levi & Conrad, 1996) and the results are in agreement that, in general, it is effective. Other researchers however consider that this issue has not yet been researched enough (Trochim, 1996; Lowe, 1999), and we adopt that opinion too.

Research Questions

The questions we have tried to clarify in this study are as follows:

- Can the heuristic evaluation be applied to the evaluation of third generation Open and Distance Learning environments, that means web-based ODL environments, and in what form?
- Given the great difficulty in finding experts to perform our evaluation, is it possible to briefly "train" some experts in the ODL basics, so that they perform adequately in such an evaluation? From our prior experience we argue that it is possible to train "instant experts" for the interface evaluation by training experienced computer scientists in the basic issues of Human-Computers Interaction (HCI) and the heuristic evaluation methodology. This view supports other authors as well (Nielsen, 1992a; Wright and Monk, 1991), that is to say that it is possible for computer scientists to understand and learn the evaluation methodologies and apply them with good results.
- If we consider the basic heuristics for the interface to be well stated (Instone, 2000), what is the appropriate list of heuristics to expand the method in the domain of ODL?

Adaptation of the method

We used two groups of evaluators. One group were experts in the domain of Human-Computer Interaction and some of them had experience from other heuristic evaluations as well. They were five evaluators. The second group consisting of three evaluators, were ODL experts and, in general, they all possessed the basic skills in computers, yet two of them were double experts: teachers of informatics with a Master's Degree in ODL, a fact that strengthened the particular group.

The issue of creating "instant experts" is a complicated one. It is known that it is possible for computer scientists to easily learn the evaluation methodologies and apply them successfully (Nielsen, 1992a; Wright and Monk, 1991). But computer scientists (the "experts") are not yet available in great numbers, so one can't argue he/she will find someone to conduct the evaluation. So the following question arises; can some power users be trained in heuristic evaluation and be allowed to play the role of the expert? These "power users" could be, for example, computer science students. Let us note at this point that simple users tend to be outside of the scope of this study, because of their reported inadequate performance during the evaluation, as already mentioned. The transition of the novice to expert with the passing of time has occupied many researchers. It starts mainly from the question of "how do we define the novice and the expert user". Demetriades (2000) argues that it is not about a quantitative differentiated accumulation of knowledge between two different human categories. What differentiates novice from experts is basically the different representations they possess for the entity, and, consequently, for the problems they are supposed to solve. Indeed, a series of studies (Larkin, 1983; Chi et al., 1981) show that the mental representations of the novice are strictly restricted to the surface characteristics of the problem, which is expected, since they are known and familiar. Contrary to the above, experts possess the ability to correlate these surface characteristics to deeper principles, in representations and abstractions of a higher level and proceed to efficient solutions.

As a reference for the criteria list we used the proposal of the Greek Open University (EAP, 1999a), according to Open and Distance Learning criteria. The basic axes were categorized, the surveys were coded and the evaluation criteria stated here were grouped. After this reorganisation, a new list emerged, consisting of 80 categorised criteria, which we used throughout our evaluation.

Organization and Conduction of the Evaluation

We prepared a booklet, which we called "Notes to the Evaluators", consisting of 20 pages. In this booklet we described the procedure the evaluators had to follow and the basic guidelines to complete the session, as well as the substantial part, which was the "training" of the evaluators for the domain in which they were not experts. The booklet provided the correspondent criteria at the appropriate points, as well as examples of their use to clarify them fully. The help we provided in the direction of the ODL was not very intensive. This had its reasoning: The size of the criteria list was big enough, 80 criteria as opposed to only 10 heuristics of the interface. So we believed that any further clarification in this direction would only discourage and disturb the evaluators, given that this list is considered to be complete, in our opinion and in the opinion of the Greek Open University (EAP, 1999a), as it was our source, and it was meant to clarify fully the domain of ODL. We also prepared an «Evaluator's Notebook», where the evaluators could write down their opinions. This notebook contained all criteria and for every criterion a Likert scale gradation, where the evaluators could register their assessment. In the scale we used «bipolar semantic expressions» (Shneiderman, 1998), to improve the comprehension on the side of the evaluators for every criterion. We used this quantitative Likert scale approach, mainly for ease in elaborating the results.

The «Note to the Evaluators» and «The Evaluator's Notebook» were delivered to the evaluators in the beginning of December 2000 and the last results arrived back to the authors in the middle of February 2001. So the time interval for the session was about two and a half months. The evaluation took place completely in an asynchronous mode, as described in Karoulis & Pombortsis (2001a).

Results, Conclusions and Discussion

Locating the appropriate evaluators proved to be very difficult. HCI specialists are very rare in Greece and geographically dispersed, a fact that is also true for the ODL experts. This was the main reason for the small number of participating evaluators. To follow up we shall not present in detail the analytical results and diagrams evolved from the session, because there are too many. For the total 90 criteria we elaborated 90 diagrams to assess the evaluators performance. So we present the results in a more concise form.

It has been made obvious from the beginning that the criteria list was too long. This discouraged four evaluators at a very initial phase, and they withdrew, even though they had stated that they would participate. In general non-ODL experts had many questions that they could not answer. It was made apparent that the help from the «Note to the Evaluators» booklet and the extensive list of criteria was not enough to provide them with enough confidence to perform the evaluation. So we can argue that the presentation of the criteria list is not the best approach, as it had been assumed. It did not clarify everything to them, to the contrary they asked for more declarations from our booklet, mainly on the domains in which they were not experts. However, the booklet was also sparingly designed, and this resulted the following questions to the conductors. So we can argue that a shorter list of criteria with a more extensive clarification for every criterion in the booklet would maybe enhance performance.

At this point we can give the answers to the research questions we set at the beginning.

- Can the heuristic evaluation be applied to the evaluation of third generation Open and Distance Learning environments, that means web-based ODL environments, and in what form?

It seems that the heuristic methodology can be applied in the case we studied as well, that is the evaluation of web based Open and Distance Learning environments. Generally, many problems of the site under evaluation were discovered, many more than the authors pinpointed during the preparation phase of the evaluation. The general impression is that with the results of this evaluation, one could propose many concrete improvements to the site under consideration, which finally is the aim of every evaluation. Levi & Conrad (1996) argue that the final assessment of every system must be made according to its usability, and as regards this point of view this study is successful. This therefore proposes modifications to a methodology towards the application of a well established method, the heuristic evaluation, to a new domain, the domain of ODL. On the other hand, some modifications are unavoidable. We discuss this issue below.

- Given the great difficulty in locating experts to perform an evaluation, is it possible to briefly "train" some experts to the ODL basics, so that they perform adequately in such an evaluation?

The approach in training the evaluators to the «twin-domain» with a booklet seems not to have helped. The experts performed well in their own domain, but with mediocre results in its twin. So an extended seminar to train the evaluators in their twin-domain seems a better solution; however it is more difficult to materialize. Or, again very difficult to materialize, the optimal solution being the gradual creation of a nucleus of double expert evaluators, which would perform the evaluations, because the two double experts we had in our evaluator team performed excellently. This study is not able to propose anything else at this point. In more detail: contrary to what we expected, the informatic experts had difficulties in understanding the basic principles of ODL and applying them successfully in the evaluation. This was partially due to their expertise as well, as they were not all instructors. Both our double experts, who were instructors with Master's Degrees in ODL, performed, as already mentioned, excellently.

- If we consider the basic heuristics for the interface as well stated (Instone, 2000), what is the appropriate list of heuristics to expend the method in the domain of ODL?

The main point that needs elaboration is the criteria list. A first estimation is that we have to abandon the notion of the «criterion» and move to the notion of the «heuristic» as used by Nielsen; that is to say a notion more like an axis to find incompatibilities or an axis according to it someone has to perform, instead of a criterion that has to be fulfilled. According to this point of view we propose the reconstruction of the list to a small number of heuristics, which can be used as axes with which an evaluator can assess the environment. Obviously this list has to be flexible to be adaptable to every

environment, and must not contain vague or equivocal heuristics, or difficultly assessable ones, which in the present study hampered our evaluators.

At this point we can propose a new list that seems to emerge from the recommendations of the evaluators, the notifications of the conductors and the already aforementioned issues. This list has of course to be validated in field applications, before it can be broadly applied in evaluations of this kind, but it provides a good starting point; in any case better than what we had at the beginning of our study. The proposed list is as follows:

<p><u>1. Content</u></p> <ul style="list-style-type: none"> 1.1. Self-sufficient educational module? 1.2. Quantity (coverage of the subject matter) 1.3. Quality (appropriateness, style, language, up to date information) 1.4. Scientific value (accuracy, validity) 	<p><u>2. ODL adaptation</u></p> <ul style="list-style-type: none"> 2.1. Targets, expected results, keywords, review. 2.2. Small and concise units 2.3. Explanation of difficult and important parts 2.4. Examples and/or case studies 2.5. Parallel material and references
<p><u>3. User Interface</u></p> <ul style="list-style-type: none"> 3.1. Visibility of system status, navigation 3.2. Simple and natural dialogs, aesthetic and minimalist design 3.3. User control and freedom 3.4. Consistency and standards 3.5. Error prevention and good error handling 3.6. Minimalisation of user's cognitive load 	<p><u>4. Interactivity with the instructional material</u></p> <ul style="list-style-type: none"> 4.1. Multimedia components 4.2. Multiple kinds exercises 4.3. Adaptable environment
<p><u>5. Communication channel</u></p> <ul style="list-style-type: none"> 5.1. Tutorial sessions 5.2. Tutor 5.3. Synchronous communication channel 5.4. Asynchronous communication channel 5.5. Assessment of the feeling of isolation 	<p><u>6. Student's Support</u></p> <ul style="list-style-type: none"> 6.1. Guidance and encouragement of the student 6.2. Guidance and encouragement of the student from the communication channels 6.3. Accessibility to the supporting elements 6.4. Assessment of the inactivity feeling
<p><u>7. Projects and «learning by doing»</u></p> <ul style="list-style-type: none"> 7.1. Summarizing exercises 7.2. Extension activities 7.3. Exploratory learning (eg. simulations) 7.4. Learning through action (eg. constructions) 	<p><u>8. Assessment and self-assessment</u></p> <ul style="list-style-type: none"> 8.1. External assessment exercises and/or examinations 8.2. Self-assessment exercises 8.3. Instant-assessment exercises

<p><u>9. Use of technologies</u></p> <p>9.1. Proper equilibrium between technologies</p> <p>9.2. The technologies support the instructional environment (not self-targeted)</p> <p>9.3. The technologies support the management of the environment</p> <p>9.4. The technologies support the communication</p>	<p><u>10. Integrating grade of the ODL environment</u></p> <p>10.1. Clear student-centered form</p> <p>10.2. Open to everybody</p> <p>10.3. Spatial freedom</p> <p>10.4. Temporal flexibility</p>
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We would like to make some comments on this list. Firstly we believe that one issue of paramount importance in ODL is the form of the communication channel, so there is a heuristic on this topic. Secondly, the heuristics of the interface assessment by Nielsen are incorporated in a more concise form as «heuristic 3: interaction with the student», so there is no more need to perform a «double» evaluation, one for the interface and one for the ODL environment. Obviously, this approach means that it is no more about an interface evaluation, but more about an «educational environment evaluation». Finally, the greatest threat for an ODL student are the feelings of isolation and the consequent inactivity, which guide in many cases to the suspension of the study (EAP, 1999a), so we consider them as separate criteria in our list.

Proposals for further research

The direction for further research has to take into consideration some core issues. The general impression is that the method is applicable and provides some great advantages as well, which are advantages of the heuristic evaluation in general: it is cheap, fast, easy to apply, the experts, despite the difficulty in locating them, are more easily brought together than the users, and it is very efficient, according to the problems it discovers in relation to the effort and the resources needed (Nielsen, 1990; Nielsen, 1992; Levi & Conrad, 1996). Consequently, the efficiency of the form used in this study can be considered as a good starting point, as we estimate that any further improvement of the method from now on will provide significantly better results. According to this point of view we propose some modifications, which however have to be first theoretically stated and experimentally validated as well.

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RESEARCH APART TOGETHER

LEARNING HOW TO DO RESEARCH IN DISTANCE EDUCATION

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Introduction

Studying at the Netherlands Open University (OUNL) implies distance education and self-study. The OUNL does not have the disposal of a large campus where the students attend their lectures. The students study at home, with occasionally a possibility to follow lectures and to get information or feedback from a teacher in a so-called study centre of which there are eighteen spread over the country. Studying psychology (the discipline referred to in this paper) implies learning about Methods and Statistics (M&S). A psychologist must at least be able to critically read research articles, and to design, perform and report about psychological research.

In 1984 the first students at the department of Social Sciences at the Netherlands Open University started their academic education. They studied at home using the written materials on Methods and Statistics we developed. Those study materials need a clear instructional design in order to make them usable for self-study. Therefore we added learning goals, marginal notes, summaries, self-assessment tests, glossaries, etc. The students got along with those materials, they gathered a lot of knowledge and passed the multiple-choice exams. But we were not altogether pleased with the results, because the students did not reach the research level we expected. In fact we found out a few years later, at the end of their study, when they were writing their master thesis that they appeared not to be able to integrate the separate M&S and psychology components in the curriculum.

We then added audio and videotapes, computer programs and research tasks to the written materials, in order to let the students practise the skills they need as a researcher. The students had to search for literature, do observations, construct questionnaires, analyse data, use statistical software and write research plans and reports, still in separate courses. They turned out to be able to develop those skills but we found no improvement in their master thesis. They still appeared not to be able to integrate separate skills in a complex research assignment, they were not able to reflect on what they were doing and they did not come to transfer.

In 1998 we started an innovation project in M&S (IMTO). We developed a complete different concept in which we force the students to combine the different skills and knowledge of the separate M&S-courses by dividing those courses into little parts and using those parts just in time in case-based research assignments within a psychological domain. In this concept the students practise the research skills several times by completing the entire research process at different competence levels. For the time being we defined thirteen levels, so students are involved in a research project at least thirteen times, each time with different aspects to focus on, and with the theoretical M&S-information tuned to what they need at that particular level. But although the levels focus on different research aspects, the students have to go through the entire research process each time.

In this paper the concept used is explained and the first results are discussed.

Competence chart as starting point

We started by defining the M&S-skills for psychology students in a competence chart. First of all an inventory was made of what psychologists have to be capable of and have to know concerning M&S. This research competence was divided back to front in successive levels by defining the prior skills and knowledge for each level. The chart describes the targets students have to reach in the four main stages in the research process at each competence level: research design, data collection, data analysis and report writing. The chart is used as an underlying structure for the assignments to develop. It determines the case on which the assignment is based and the necessary M&S-sources needed at a certain level in order to give the students the right background to complete the assignment.

Developing research assignments

For each competence level a project-team is set up to develop a study task at that level. These teams are multi-disciplinary, i.e. there are M&S specialists, psychologists, didactic specialists, educational technologists and ICT-specialists involved. Such teams get support for the logistical, administrative and technical aspects in the implementation phase.

The teams develop case-based assignments within a psychological domain. Because the students have to concentrate on M&S while working on these assignments, the chosen psychological domain has to be one the students are already familiar with. The students use the theories of the psychological domain in the conceptual model of their research. We lead them through the complex research process by dividing the assignment into subtasks and give them an opportunity to practise by offering jobs within the subtasks. The subtasks follow the structure of the research process. The competence chart points out for each level which stage of the research process must be dealt with summarily and which one we have to treat in detail. These jobs force the students to study the sources in an active way, i.e. not just read them but search for information they can use as a psychological theory for their research or they can use to make the right methodological choices and information to help them choose and use the appropriate statistical techniques. Depending on their prior knowledge, the sources can be applied according to the students' needs. Of course the didactical approach remains very important and learning goals, assessment criteria, summaries, self-assessment tests, glossaries, etc. are still used.

Collaborative learning in distance education

In daily practice doing research often turns out to be teamwork. To imitate a real life situation we wanted to use teamwork in the research assignments for the students as well. This way they become acquainted with collaboration, which we think is not only very important but in this study-setting also a necessary condition. The assignment has to be done in three or four months, which would be nearly impossible for individual students. By allocation of jobs and by combining data the students get the research work done in time. Merging individually collected data saves a lot of time. Each student approaches only eight to ten respondents, which is in fact not enough to use for analysis. By merging the data, the number of respondents becomes sufficient to allow them to use all statistical techniques. It was a great effort to develop jobs in which the students must work together: it had to be effective for the task and efficient for the students. One of the principles of the OUNL is that students are free to choose their own time and place to study and that they may set, speed up or increase the pace whenever they want to. That principle had to be somewhat departed from to make the collaboration possible. The result is an approach in which individual work and teamwork alternate. Since this teamwork-approach is quite new for OUNL students, we oblige them to hold to it by defining compulsory jobs. Once they get used to it and see the advantages we think it provides, we expect them to collaborate voluntarily.

The appropriate study time differs from student to student, therefore it would be very difficult to ask the participating students to meet one another physically. Most of the OUNL students are adults with a job and a family and they are studying in the evenings and weekends whenever they have spare time. The OUNL electronic learning environment "Studienet" brought the solution. The study task is placed on the web to which the students have access twenty-four hours a day, seven days per week. There they find the task, the subtasks and jobs, the sources with explanations of statistical issues and psychological theories. The collaboration facilities are found there as well.

Apart from the accessibility, the electronic learning environment offers more advantages. The assignments and sources can easily be updated as opposed to the written materials of which the term of use is five years and revision requires enormous effort. The electronic environment also makes it possible to add new didactical elements:

- a clear structure for the web pages, reusable for each level in order to let the developers easily put the materials on the web pages and to let the students easily find their way in the study tasks;
- the assignment as starting point for the students, which makes it possible for students to personalise the way and the extend they use the sources (demand driven);

- hyperlinks, of which the use provides students with an easy access to the particular information they need, even in previous levels (just in time learning);
- frequently asked questions (FAQ's), which prevent the teachers from answering the same question more than once;
- audio instruction, which increases learning effects wherever textual and visual information are combined;
- animations and presentations, which provide the students of working samples and clear explanations;
- the possibility to download software and files from the server, which makes it easy to offer the students supplementary or actualised materials;
- electronic logging, from which we gain a clear insight in the time the students need for the assignment and for the separate jobs;
- (in the future) an electronic dossier, in which the students can save their results and in which the study progress can be followed for the students themselves and the tutors.

Furthermore the web offers the students a home base, a virtual community to which they are attracted and where they can contact teachers and fellow students. We call it: the Virtual Research Centre (VRC). This virtual community functions better as the students follow several pilots: they get to know one another and ones study habits and sometimes ask to be placed in the same group as other students they know from earlier pilots.

Communication facilities for distance learning

Asking the students to collaborate in their research assignments, implies that the OUNL had to make arrangements for communication. The electronic learning environment is well suited for this purpose. The students can use newsgroups and real-time conferencing. E-mail would technically be possible, but we ask them not to use that means of communication as newsgroups are more functional: every message posted in a newsgroup can be read by and benefited from all other students whereas e-mail is mostly addressed to one person.

We ask the students to work in small groups on certain subtasks and discuss and justify their ideas, choices, results etc. by means of newsgroups and real time conferencing. The students are told to post their results of a certain subtask in the newsgroup, to read the results of the other students of their group and to make notes for discussion. That discussion takes place by means of real time conferencing, for which the possibilities are the same as for the assignment: twenty-four hours a day, seven days per week. NetMeeting, the program used for real time conferencing, has some fine possibilities: the students can share a whiteboard to draw for instance conceptual schemes during the conference, they can share applications and send files to one another and they have the possibility to save the drawings made and the transcripts of the discussion. In this way they can look back at the discussion and the teachers can read it afterwards; they do not have to be (virtually) present at the moment of the discussion, what is proved to influence the discussion (students discuss more freely without the teacher 'present').

Justifying their choices, forces the students to think about what they are doing, why they do so and what alternatives there could be. We think it leads to more insight in research. Furthermore the discussions lead to feedback from their fellow students: they tell one another what they think about the results, ask for explanations and illustrations and by doing so they learn to argue strictly logical and to discuss the methods used in the context of the entire research. Every choice they make, has to match with the previous decisions made. The developers do not structure the discussions beforehand. The students themselves work that out, appointing a chairperson and making rules for the discussion. In practice however, it turns out that not every group is able to discuss in a functional way. Students do not always give real arguments for their choices, but just say that they think it is right or wrong. In the future we want to structure the discussions by providing argumentation tools. The first little step towards this is being tried out in a pilot. We want the students to use the argumentation model of Toulmin in their discussions (Akkerboom et al, 2000), to make them use grounds for their conclusions, search for warrants and backings to those warrants and be attentive to rebuttals and qualifiers.

Discussion is a useful leg up to peer assessment, which we want to put into use in the higher levels.

First results

The first three levels of M&S have been tested with small student groups (approximately twenty five students), a pilot of the fourth level has just started. The results show great promise. The students perform research without fear of statistics or report writing. They just get started and are kept with their minds to the assignment by the jobs and the collaboration with their fellow students. We even do not mention that they are going to use statistics; we just tell them they have to do something with the data they collected. They appear able to justify the choices they made and, after habituation, they accept that in research there is often more than one answer possible, depending on the approach chosen. It takes time for them to get used to the idea that the teachers are not the first persons to address when they have problems or questions; that they have to use other means to get their problems solved or their questions answered: First of all they can refer to the sources we provide them with. After that they can consult the FAQ's and the newsgroups to see if their problem or question is already dealt with. If that is not the case, they can ask fellow students for help by placing a message in the newsgroup. When all this does not bring the solution, they may ask the teacher for help.

The students are quite positive about the communication facilities, although they have to get used to them and sometimes have to overcome technical problems in order to make it possible to use them. They report having a lot of contact with their fellow students, much more than in written courses. The contact is highly appreciated, exactly because it is functionally used within the assignment and not only for social talk (although that is allowed too). The contact sometimes even continues after the pilot: the students form study groups of their own.

In the beginning there were a lot of technical problems. Now we can partly prevent those by giving guidelines for the hardware and software the students need in order to participate and by taking care of clear instructions on the web pages. The students will find there how to install and use the software and how to focus the electronic means of communication on their computer. Possibilities for real time conferencing were limited in the beginning, due to the low-powered servers, which are now replaced by more powerful ones. Still, the computer configuration has to meet with quite large demands and the students have less freedom in choosing time and place to study.

The students appear more critical than we demand them to be, they are often less satisfied with their performance than we are and they want more theoretical backgrounds than we provide them with. They get intrinsically motivated by the assignments and sometimes try to dig to the bottom of the research problem.

We ask the students to keep an electronic log file up to date. This provides us with information about the time spent on the assignment as a whole and on the different subtasks and jobs. It is used for evaluation purposes. We ask the teachers to do the same, as we want to get insight in the time needed to develop this kind of M&S assignments and the time needed to answer questions from the students, to follow the student discussions and to adjust, complete or update the assignment when needed. The students sometimes complain half way that this kind of assignments takes a lot of time, far more than the traditional M&S courses. Analysing the log files at the end of the pilots, the time spent turns out better than expected. The average study time used is about the time we estimated. There are exceptions, but overrunning is often due to technical problems or to voluntary deeper digging into the research problem or the theoretical backgrounds than needed to do the research.

We should mention here that this way of studying M&S is only experimentally available for small groups moreover the students subscribe voluntarily for the pilots, therefore the group does not represent the average OUNL-student. Most of the students still follow the regular M&S courses. The participating students like working with the computer, and almost all of them are familiar with internet and e-mail. Furthermore the experimental status of the pilots prevents us from a lot of complaints by deficiencies, mistakes or technical problems. The students are very understanding and try to give hints for improvement.

Discussion

With this project (IMTO) we try to achieve an innovation in the complex M&S education: we can speak of an innovation in

- M&S, by using a competence chart as a starting point and by learning M&S by performing research assignments with the content of the traditional M&S courses spread over the levels;
- psychology, by integrating a psychological domain in each research assignment as a case (problem context) to depart from and as theoretical concept for the research;
- instructional design, using competence-oriented instruction, collaborative learning alternated with individual tasks, argumentation jobs, peer assessment and various assessment tools.
- educational technology, by making optimal use of an electronic learning environment with communication facilities;

The four fields are interdependent; you have to consider every field to get the right environment for a case-based M&S assignment usable for distance education.

Within the foreseeable future we have to examine what logical, administrative and technical changes are needed in the OUNL to make it possible for all psychology students to exchange the current M&S courses by this innovative way of learning M&S.

Meanwhile we are also testing our hypothesis that the assignments are reusable for other educations. We made a generic M&S study task, which we think is adaptable to various professional fields with little effort. The first try-out forms a cautious basis for this hypothesis. Changing the field specific elements from psychology to public administration appeared possible.

Doing research is a competence, which we think can only be achieved by practice. We want our students to become competent psychological researchers, therefore we have to let them do research, using the possibilities of the OUNL electronic learning environment. The first results are encouraging, therefore we continue this way. The test for the improvement by the innovation follows in a couple of years when the psychology students who followed this new method of learning M&S are writing their thesis. We hope they will present well-considered research plans, which they will implement using the right tools for data collection, making good use of statistical techniques and statistical software and reporting about it in well structured research articles.

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THE ROLE OF BEGINNING TEACHERS IN THE IMPLEMENTATION OF INFORMATION COMMUNICATION TECHNOLOGY

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The overarching aim of this research project¹ is to examine in what way beginning teachers can contribute to new knowledge regarding new forms of learning in technically mediated contexts. Also, the research interest is to study the role beginning teachers can play in the implementation of the use of Information Communication Technology (ICT). Learning at the workplace is focused in the study. The workplace is looked upon as a meeting place between theory and practice where knowledge development can take place (Hultman, 1998; Andersson, & Andersson, 2000). This matter is also linked to beginning teachers' reflections and challenges at work (Andersson, 1999). The underlying assumption is that lifelong learning is an interactive process, where communication and dialogue is contrasted to transfer of knowledge. Hence, the present study examines forms of learning strategies, learning awareness and whether beginning teachers can act as change agents in the contexts of Information Communication Technology.

Initially, we have performed a literature review that covers general aspects of beginning teachers. We have also conducted a survey of Swedish beginning teachers during their first year of teaching in primary and secondary schools. When comparing the outcome of the review with findings of the survey we discovered that there are two different approaches in the studies, which reflect the roles of beginning teachers (Andersson, 2001). On the one hand, the literature review shows that beginning teachers are mainly defined as learners. In this view there is a great need for mentoring and beginning teachers' status seems to be on a low level. From these studies we get the impression that this line of research is the dominating perspective. On the other hand, when beginning teachers are seen as carriers of competencies that are needed in educational settings but not commonly shared among more experienced teachers, the status of the former group seems to be radically changed. In our survey on beginning teachers we found that teachers who could demonstrate skills in ICT were highly appreciated and gained a fronted position in quite a few cases. For example, they were appointed as responsible for the development of ICT at their schools, which made them become kind of change agents within this particular field.

Drawing on other studies, teachers' skills and attitudes to ICT are crucial for the implementation of ICT projects in technically rich, problem-based collaborative learning environments (Clarebout & Elen, 1999; Nordstrom, 2000). These studies show that the outcome of ICT-projects depends on to what extent the teachers have skills in handling technical means of communication. This reasoning draws attention to the need for in-depth studies on beginning teachers' proficiency in handling ICT. In addition, regarding distance education, multiple forms of working are of interest to examine. This may lead us to an awareness of new ways of ICT-learning, which in turn make learning accessible to a variety of groups of learners (Holmberg, 2000). These aspects highlight three integrated problem areas: (1) beginning teachers' role in the implementation of new projects, (2) their forms of learning in terms of ways in which they create new knowledge at their workplace and in distance education and (3) whether and if so, beginning teachers may be recognised as change agents in the field of Information Communication Technology at their schools.

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¹ This project is in its initial phase. Distum has provided a two-month planning grant based on an application entitled: "Nyutbildade lärares reflektioner över informationsteknik och distansutbildning" (Andersson, 2000) [Beginning Teachers reflections on IT and Distance Education]

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CHANGING LIVES: THE TRANSFORMATION IN ATTITUDES TO AND EXPERIENCE OF NEW TECHNOLOGIES AMONGST DISTANCE EDUCATION NURSING STUDENTS

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Introduction

This paper is concerned with the potential use of Information Technology as a resource for teaching and learning in nursing education through distance education in Ireland. It focuses on the responses and attitudes of two cohorts of Registered Nurses in Ireland who are currently taking a Bachelor of Nursing Studies degree programme through distance education.

Having identified the general background in Ireland the paper examines the experience of these two different cohorts of students with new technologies, both at home and in the workplace. In doing this the paper explores the extent to which these experiences are changing and the differences that can be observed within a short period of time. Assessing this changing experience is important for the process of identifying the potential and possible problems that would be involved in integrating IT into the learning process for such students. The paper also examines their attitudes and opinions in relation to the use of these technologies for nursing and nursing education and how these are developing. These can help determine how important students consider the acquisition of IT skills for both work and education and therefore the extent to which they would bring a positive attitude to learning through these technologies

The first part of the paper sketches nurse education to date and its current rapid process of transition. It indicates the increased reliance and usage of new technologies in the health sector in Ireland and the experience of nurses with this, and relates all these developments to the general state policies in relation to new technologies and education in general.

The second section of the paper focuses on the student cohorts and their experience to date with new technologies. It examines students' own feelings about the likely impact of such technologies on both nursing and nurse education in Ireland. The final section draws some conclusions and relates these to the potential use of information technologies for distance education for nurses in Ireland.

Background

Nurses make up the largest group of persons employed in the health services. In 1996 there were 53,641 nurses recorded on the register and of these 44,822 were active and eligible to practice nursing in Ireland. In the profession as a whole 93% of those registered were female.¹

Until recently nurses were trained under a traditional or 'apprenticeship' system dating back to the nineteenth century. In this system theoretical and practical instruction were provided in the hospitals. In the last few years this traditional system has been undergoing a transformation and there has been a move to a diploma based pre registration education programme. A further one year optional study at University level which will give them a university degree. In a further two years this new system will itself change and all student nurses who successfully complete training will receive a degree.

These changes in the Republic of Ireland bring the system of nurse education more into line with that operating in many other countries, countries that often employ numbers of Irish trained nurses. In Australia and the USA, for instance, there have been third level college based pre registration degree programmes for a number of years.

In a world where nursing is increasingly integrated into third level education and degree programmes are increasingly common it is far from surprising that the Republic of Ireland has initiated changes in nurse education. However this raises the issue of existing registered nurses within the Republic and the opportunities for them to achieve educational qualifications in line with the new diploma and degree level nurses.

Many registered nurses cannot participate in on campus courses. They may live far from the geographical centres of provision of such programmes, which are mainly to be found in the main Irish cities: Dublin, Cork, Limerick and Galway. In addition, and maybe more significantly, nurses may often be constrained by their own work and personal circumstances. Although many nurses in Ireland work in the traditional hospital sector at least half work elsewhere; for example in nursing homes, private hospitals, for agencies or as practice nurse with GPs. Many cannot have access to or afford the time off work, they may have personal commitments that prevent them and these circumstances preclude them taking advantage of educational opportunities offered on campus. To meet the needs of such students the National Distance Education Centre², sited at Dublin City University, has, in co-operation with An Bord Altranais³, developed a distance education programme for registered nurses which enables them to study from home for a Bachelor of Nursing Studies award.

Currently this programme is presented in a classic distance education text based format, supported at local centres around the country. The programme is presented on a national basis and there are currently students from Donegal, the furthest north of the Irish counties, down to Kerry, one of the most isolated south-westerly counties.

This paper focuses on three issues in relation to these distance education students:

- the possible use of information technology as part of the learning process in distance education for nurses
- the increasing changes and introduction of IT into the health services and awareness of its penetration
- the use of IT in education in general and nurse education in particular

and examines the background and experience of the student body in relation to these issues.

Firstly with small numbers and the development of a programme of options within the degree structure it is often difficult to provide study centres for a particular topic close to an area where students live. This can still mean substantial travelling on occasions to get tutorial assistance or meet other students. In these circumstances the employment of information technology, whether e mail, computer conferencing or video conferencing or use of the WWW would seem to be a realistic option, especially as costs within the Republic of Ireland fall and in light of the increasing use of such technologies in nurses education elsewhere.⁴ Information technology therefore could be perceived as having a role to play in the meeting the needs of those nurses who choose distance education because they are geographically isolated and unable to avail of other educational opportunities.

However the fact that the majority of distance education nurse students are in the Dublin area also seems to suggest that many students have chosen distance education for time or personal reasons, They are not geographically precluded from attendance but are not free to do so. For these students the use of technologies could also meet a need in that materials, conferences, e-mails etc could introduce them to a system of learning and offer them support in a manner that was neither time nor place dependent. However to make such changes in the future and to introduce such techniques it is necessary to gain some idea of the general experience and background of students with IT. The paper therefore begins by looking at the type, level and extent of their current experiences as a basis on which possible moves into this area could build and starts to examine how rapidly this situation is changing as part of an assessment of likely future developments.

Secondly, it seemed likely that nurses themselves would be aware of the increasing penetration of information technology into their occupational area, as well as having a more general social and cultural awareness of developments. The paper therefore examines the extent to which nurses are aware of and involved in these changes. Awareness of the changes would be likely to make students find the introduction of IT into any future distance education learning process both necessary and acceptable.

For all these reasons a study of nurses enrolled on the programme was undertaken in 1999 to examine responses and attitudes in relation to information technology and nursing. This study was repeated the following year to gain some understanding of how rapidly changes were occurring.

Case Study Participants

The questionnaire upon which this case study is based was issued by post to all students registering for the degree programme in 1999 and then in 2000. There was a response rate of just over 50% in both cases.

These students matched the general profile of nurses in that the majority of them are female

National	Distance Education 99	Distance Education '00
Female 93%	95%	96%
Male 7%	5%	4%

The areas of work from which our students come show that distance education appears to be meeting the needs of particular groups within nursing. In particular the students show a higher percentage drawn from mental handicap and from the 'other' sectors, which may reflect current opportunities available to them and more restrictive conditions in smaller institutions, clinics or with agencies.

	National Figs	BNS Students 99 (expressed as %)	'00
General	56 ⁵	37	44
Psychiatric	13	7	8
Sick children	4	0	3
Mental handicap	4	23	15
Midwifery	19	7	8
Public health	3	7	5
Tutor	5	0	-
Other	5	19	17

Because they are registered nurses, often with substantial practical experience, and often with much educational experience, the members of the distance education programme for nurses' fall into older age brackets

age	99	'00
20-25 years	14	-
26-30 years	28	17
31-35 years	12	37
36-40 years	35	25
41-45 years	14	9
46-50 years		8
51-60 years		4
61+ years		-

If the use of technologies were to be seriously considered in distance education it would be of assistance to know the extent of these students background and experience in relation to computers

Experience and training

In Ireland the use of computers in the health care sector is expanding rapidly. However, in this sample nurses who currently encounter and have to use a computer-based system at work were in the minority, only 42 % of students in 1999 used a system for any reason at work. This situation is changing for in 2000 this figure was 49%. The majority of those who are users are involved for clinical and administrative reasons, and increasingly for management.

Area	1999	2000
Clinical applications and practice	67%	47%
Education and training	6%	16%
Nursing administration and personnel management	22%	20%
Nursing management		12%
Research	5%	5%

The majority of nurses using a computer based system had received some training , although the source of this training varied

	1999	2000
Initial training		10%
On the job training courses	58%	33%
Course purchased by the student from sources outside nursing	25%	47%
school		6%
In nursing		4%
other	17%	

The figures show that an increasing number of students seem to be arriving with some exposure to IT in school or initial training. Registered nurses are also starting to assess their future in this context and with an awareness of future demands upon them. As one student who was not currently involved in using computers at work stated:

I believe that within the next five years most of the documentation that nurses currently do will be done on computer. For that reason I am currently enrolled with the local VEC and undertaking the Information Technology stage 2 course (15)⁶

The 1999 student group as a whole rated their own computer literacy at a low level. However, as the figures for the following year show this situation appears to be changing rapidly. A group now rated themselves as highly literate and the somewhat literate had also increased.

	1999	2000
Highly literate	-	7
Somewhat literate	42%	51
Barely literate	35%	36
Illiterate	23%	6

When asked their response to the statement ‘ Computers are very relevant to the future of nursing’ the majority rated computers as extremely relevant to the future of nursing and of nursing education.

	Strongly agree 1	2	3	4	Strongly disagree 5
Highly Literate	83	<i>17</i>			
Somewhat literate	61% <i>41</i>	33% <i>44</i>	6% <i>7</i>	- 3	- 5
Barely literate	60% <i>47</i>	20% <i>23</i>	20% <i>27</i>	- 3	-
Illiterate	30% <i>40</i>	30% <i>20</i>	30% <i>40</i>	10%	-

(figures in Italics are 2000 figures)

It can be seen that as their experience with computers grows the more important students thought computers would be for nursing.

Such opinions as to the importance of new technologies and their likely future impact may well be drawn not just from changes in the context in which nursing practice occurs but also due to the general societal emphasis upon Information technology. In the Republic of Ireland, as in Britain and many other countries, the rapid development of Information Communication Technologies and their penetration into all levels of society has led to public policy initiatives, particularly in relation to education. In addition, such initiatives at local, regional and national have been re-inforced within the European Union by Task Force Reports and the development of Action Plans.⁷

Access and use of the Internet

Increasingly the World Wide Web is having an impact upon third level educational experiences. The web is being used for administration, for the distribution of materials and as part of the learning experience⁸ Nursing education is also turning to the Internet including for contact with Faculty, to connect to libraries and repositories and to other sources of information⁹

Students were therefore asked to assess their own level of familiarity with the Internet, covering both information and communication uses. In 1999 no one claimed to be very familiar with the Internet and its uses. Indeed the lack of familiarity in 1999 suggested that the introduction of new technologies as part of the distance education learning process would require substantial preparation and support. This situation had altered dramatically for the following years cohort.

Self assessment	Very familiar		Somewhat familiar		Not at all familiar
Highly literate	- <i>50</i>	- <i>50</i>	-	-	-
Somewhat literate	- 7	11% <i>22</i>	28% <i>47</i>	33% <i>12</i>	28% <i>12</i>
Barely literate	-	- 3	6% <i>23</i>	33% <i>27</i>	53% <i>47</i>
illiterate					100% <i>100</i>

(2000 figures in italics)

Effects on nursing and attitudes to change.

The evidence suggests that students are well aware of the changing situation and generally feel very positive about the impact that such changes will have in nursing. This is confirmed in their comments, which come from the least as well as the most experienced with computers

I am completely and utterly computer illiterate at the moment.... But I am acutely aware that they will (affect my future as a nurse). (20)

I am eager to know more about computers, especially with regards to nursing research and wait the day that I can find possible answers to a particular nursing problem by keying into my computer at the nurses' station. A comprehensive nursing library on the ward computer would be a huge advantage (3)

Yet the use of computers is never far from their main concern with the welfare of their patients.

The use of computers is a daunting thought especially to people like me who have trained under the 'traditional' style and are not comfortable with computers. But I do believe that if used correctly, computers will enhance the care of patients and hopefully reduce the workload of the nurse. (25)

I see the computer being used to assist the nurse with clerical/ documentation/management work and allowing more time available for direct patient care/contact/ this is indeed a step in the right direction (11)

Conclusion

The study outlined above suggests that the pace of change in relation to information technologies and attitudes and experience amongst nurses is changing extremely rapidly. The 1999 results indicated that many nursing students might need support if IT was introduced into the presentation of distance education nursing courses. Yet in the course of one year changes were such as to suggest that the need for any such support would diminish rapidly.

In the body of nursing in general there seems to exist a very positive and optimistic attitude towards the role of computing and information technologies in nursing and nursing education. The pace of change suggests that we can soon expect the majority of nurses to be entering the programme familiar with the uses of IT both in work and at home. Therefore the use of it in this degree programme and future postgraduate programmes seems an increasingly realistic alternative to a text based programme.

¹ Report of The Commission on Nursing : A blueprint for the future, Stationery Office: Dublin , 1998

² The National Distance Education Centre develops and provides distance education programmes for the Republic of Ireland in co-operation with the universities and other third level institutions on the island of Ireland.

³ An Bord Altranais is the Statutory regulatory body for the nursing profession in Ireland

⁴ This is particularly the case in Canada, the USA and Australia.

⁵ **ABA Report** 1996

⁶ VEC (Vocational Educational Committee) These are State funded boards which provide some second level education in Ireland but also run a large number of evening classes

⁷ European Commission (1996) **Report of the Task Force: Educational Software and Multimedia,**

⁸ European Commission (1996) **Learning in the Information Society : Action Plan for a European Education Initiative** 51-60

⁹ For recent examples see Dr P J Martyr, 'Teaching a Bachelor of Nursing unit on – line : some experiences and results', **Australian Electronic Journal of Nursing Education**, Vol. 3, No 2, March 1998 http://www.scu.edu.au/schools/nchp/aejne/vol3-2/pjmartyrvol3_2.htm , K Roberts et al, 'Surfing and distance dialoguing : an electronic education pilot project', **Australian Electronic Journal of Nursing Education**, Vol. 3, No 2, March 1998 http://www.scu.edu.au/schools/nchp/aejne/vol3-2/krobertsvol%203_2.htm; K Updegrave, 'Teaching on the Internet', <http://pobox.upenn.edu/~kimu/teaching.html>

EDUCATING TUTORS – AND OURSELVES

A REPORT FROM A COLLECTIVE EFFORT

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Introduction

This paper describes the process that the academic staff at NKS Distance Education went through with respect to the goal of helping our tutors to become successful online tutors. Our main focus in the paper is on the process of developing an online course for our part-time tutors. As academic course managers we are responsible for both the production and the tutoring of our online courses, and we decided that it would be useful for *all* of us to engage in the development of this course for online tutors. The course is now in a trial phase, and we have come to realise that the process has contributed to a considerable, and much needed, increase in our own competence as providers of internet based learning. The collaborative approach to the development of the course has inspired us to writing this paper collectively as well, and it includes three personal contributions along with the more general description of the process.

From technology to pedagogics

After having tried out several learning management systems (LMS) over some years, NKS decided to go for an LMS that was developed at Lund's University in Sweden, Luvit. In August 1999 NKS launched the new "NKS Net Studies" with about seventy courses, all on the Luvit platform.

There were many reasons for choosing the Luvit platform, mainly pedagogical. For us, the academics, the many possibilities for online communication in the Luvit system, were given high priority since communication has always been the core of our pedagogics. For almost ninety years the Royal Norwegian Mail had served our distance education activities conscientiously, now was the time for the Internet and Luvit to take over.

We have an established pattern of meeting every fortnight to discuss educational matters. We exchange ideas and experiences and discuss pedagogics. With the introduction of Luvit, Luvit came to be the centre of our attention. We needed to become Luvit experts so that we could guide our part-time tutors and answer all kinds of questions. And certainly, we needed the expertise as course developers. Mastering the LMS tools was central to our own competence as distance educators in a new online environment.

Our online tutors were also concerned with learning the tools. We invited them to a workshop to learn how to use Luvit in their online tutoring. The workshop was partly concerned with the pedagogics of online tutoring, but we realised later that we had been too vague. The explanation was clearly that we had not yet fully understood what the transfer from correspondence tuition to internet based teaching involves. And actually, the tutors were also more interested in the technology part.

During the first year of Luvit, we saw that there was a great need among our tutors for a better understanding of how-on-line learning works. There was an obvious need for more training. We decided to develop an on-line course about on-line tutoring. The Ministry of Education gave us some project money as part of a distance education development project, and we started planning the process.

In autumn 2000 we invited some of our most experienced on-line tutors to a meeting with the intention of exchanging ideas and learning from their experience of best practice. We wanted their help in the first step of our process: creating a credo and a basis for our educational practice.

Next, we worked on the credo internally, and the result was not really a credo, but what we call our pedagogical platform: Our *Four Commandments*:

1. We shall ensure that we create an environment of self-instructive and independent study.
2. We shall monitor and follow up the needs of each individual course participant.

3. We shall act as facilitators to creating an environment whereby course participants learn to make full use of each other in the learning process, both socially and academically.
4. We shall acknowledge and respect the fact that course participants organise their learning programmes in different ways, and that each participant will have his/her individual needs for forms of independent study, communication and collaboration with other course participants.

The challenge was to integrate the four commandments with the different functions and possibilities in Luvit – in on-line courses where pedagogics and technology would be joined hand in hand.

The development of the course “How to teach on-line”

We were a group of nine colleagues who engaged in the development of the course, six academic course managers, our web master and our development coordinator. We had different academic backgrounds, different perspectives and a different (and quite unclear) understanding of the goals for such a course. We were also pressed for time. It was December, and we planned to have the first version ready for a first trial in March. Everybody had a lot to do already, but the only option was to “dive in”.

We searched the Internet and the bookshelves for some good literature on the subject, since we needed some support for our own experience when we wrote the first draft for the course. In the following process of trial and error, eye-openers and revelations, defeats and insights, discussions, frustrations and agreement, there finally emerged a common agreement of what we wanted with the course – and how it needed to be designed. This can be summarized as follows:

- *The course should make our prospective tutors understand how the “Four Commandments” can apply for all functions in the Luvit system*
We knew Luvit well, and we had many thoughts, on a more general basis, what was important for effective on-learning. But we had not made it clear to ourselves how each of the functions in Luvit could be used to comply with the way we want to teach. Also, the Four Commandments were finalized after we had started developing the course. This meant we had to reorganise our first draft, and it took a while before we understood how to do that.
- *The course should be a model course that could induce the tutors-to-be to reflect upon the experience of being a student.*
At NKS Distance Education we had always spoken warmly about the importance of putting yourself in the place of the student. But we realised that we had never really tried to do so. We would try to design the course so that the prospective tutors would be forced into the role of a student, and asked to share his or her experiences of being in that role.
All this represented a new orientation that developed from our work with the pedagogical platform, and the solutions did not come without loud utterings of frustrations and swinging battles of swords.
- *The course should be goal-oriented, easily accessible, practically oriented without too much academic theory.*
With only a few exceptions our tutors work only part time for NKS. This means that they, just like our students, have very limited time for extra work or study. We respect this fact, and do not want to give them more work than we find necessary. And yet, it is difficult to combine this consideration with the need to open their eyes to the broad range of possible online tutoring activities.

Three glimpses into the process – by three of us

1 A double perspective (Ivar)

If we were to “practise what we preach”, we had to develop a course where the tutors become students and the course developers become tutors. The creation of these double sets of roles became a great challenge, and at the same time the importance of doing just that became increasingly apparent.

If the tutors take their role as students seriously, such an experience will be useful when they meet their own students later, in their role as tutors. But in order to make this happen, the tutors need to reflect upon the experience of being a student: – with respect to the Luvit system, the course material, the course

structure, the assignments and tests, and certainly with respect to the relationship with the tutors, that would be ourselves in this case.

As course developers we had to make sure we were creating a good course with an appropriate structure and course content. At the same time we had to put ourselves in the role of a tutor, and structure the communication process in a way that would inspire an easy flow of responses between us as tutors and our tutors-to-be as students.

Let me explain the double perspective by giving three examples:

- We have created assignments where the tutors-to-be must change from the role of a student to the role of a tutor. One example is that they are asked to describe how they, in the role of a student, like the way the course tutor presents him/herself in the introduction of the course. (All tutors must write a written presentation of themselves in the course.) Afterwards they are asked to write such a tutor presentation themselves.
- We challenge them, as students, to be aware how quickly the tutors respond to messages from them. Next they are asked, as tutors, to discuss acceptable time-limits for answering messages from a student: within two hours? twenty-four hours? two days?
- We ask them to take notes about their own reactions as students during the course, and share their thoughts and reactions in a “reflection forum” at the end of each module with other tutors-to-be.

Practising what we teach is not always easy, but it is worth while trying, it brings us one step further!

2 From instruction to discussion to construction (Ilmi)

Since the launch of NKS Net Studies in 1999 we have contracted many new online tutors, and many of the “old” correspondence tutors have also been trained to become online tutors. The demand for Internet based courses has increased rapidly over the past two years. For us in the academic department this has meant developing new Luvit courses in a haste and under great pressure. It has been difficult to find time to think about and reflect upon pedagogical matters. For lack of time, the training we have been giving our tutors has mainly consisted of instructions in the use of Luvit and different kinds of urgent messages.

Developing the course for online tutors has certainly brought us many steps forward as regards developing our own competencies. This project has provided us with the open space we have needed to see our own daily work in a wider educational perspective. The purpose of the course is indeed to give our tutors the necessary Luvit training, but it is also to give them the chance to reflect upon their role as tutors and how they use the various Luvit functionalities to create learning opportunities for their students.

A simplified version of the process can be described like this:

The starting point was an unsatisfactory situation both as regards the way our tutors were teaching and the way we were organising their training as online tutors. So we asked ourselves the question: Who do we want to be, and what kind of learning environment do we want to create for our students? The discussion resulted in the Four Commandments. Our newly acquired pedagogical platform would then become the guiding principles for the development of our course and for our teaching practice as a whole. We were back on a practical level.

Developing the course has meant an exercise in how to improve our educational practice. We have gone from instruction to discussion to construction, by working together and constructing something together. It has been a meaningful way of building new competencies for ourselves.

3 Merging technology with learning (Atle)

I happen to believe that some kind of structures or patterns somehow are important for all sorts of cognition, e.g. retention or understanding or even motivation. I also happen to be a web master at NKS Distance Education. That means I get a chance to work with a particular kind of structure: Teacher-based distance education courses delivered over the WWW.

We use a learning management system (LMS) to create and publish our courses. The LMS supplies a default course interface and allows for easy uploading of documents, discussion forums, tests and so on. But we still need to design and produce content pages. Our preferred format for content is HTML-documents. These documents contain mark-up for text and links to images. In addition, all pages include links to a document containing JavaScript that offers some extra functionality such as dialog boxes and a Cascading Style Sheet containing style definitions for HTML-elements.

Now, in a web based course there are of course a great number of substructures that need to be well formed and coherent - from single paragraphs that should make inherent sense, to discussion forums that should appear just when they're needed, ensuring that there is a logical progression in the course as a whole. Fortunately, there were a number of colleagues working on this project writing the texts, which made it possible for me to concentrate on the kind of substructures where I might make a difference: visual design and navigation.

I also had a slightly hidden agenda: In general we need to continue improving the navigation, aesthetics and functionality in all our courses. As this course involves only staff at the NKS and a limited number of our tutors, it was an ideal arena for testing out new approaches. If we were able to set a standard for how our courses should look and feel in the near future, that just might leave us free to move towards a much-needed next level. What would it take to do this?

Let's see what we have, apart from the actual content of the course:

- An LMS with default look and rich functionality
- HTML-documents
- Style definitions in a Cascading Style Sheet (CSS)
- Scripts in a JavaScript file
- Images

A designer could improve upon all these elements, but a key concern was that any changes had to be easy to work with for our academics and tutors. They are not designers, nor should they have to be. For document production they generally work with a basic html-editor customised to be used with our style sheet.

NKS had recently implemented a new graphic profile, including colour schemes, letter heads etc. As it happens, the LMS application is "skinnable" and the new logo and colours could be transferred to the entire LMS. Similarly, the style definitions for HTML-elements were altered to reflect the new profile.

In addition some new elements were added to the style sheet, taking advantage of better support for CSS in new web browsers. One such key improvement is support for positioning of elements on a web page. This helped solve one problem: in the LMS, access to course documents is given through a vertical menu placed on the left side of the user's screen. This menu tends to fill up quickly with too many menu items, causing confusion and reduced usability. By making an HTML/CSS menu and place it on the same spot in all content pages, we achieved two things: Reducing the clutter in the LMS menu and improving navigation and usability. Furthermore, it also meant making the structure of the documents in each section of the course more easily discernible to users.

Only two more things were needed. First, we should make better use of the LMS capability of creating things like multiple choice tests and interfaces for submitting assignments to the teacher. Secondly, we should prepare for what is likely to be our next step in course design: adding multimedia. So we did a bit of that too, adding sound, page transitions and animation.

I, for one, felt we now had a template that might prove useful for the production of other courses.

Building new competencies

As mentioned earlier, we had become fairly competent users of the Luvit system. When it was decided that the whole academic department were to be involved in the development of the course for our tutors, it

was probably with a hind thought: that it would also mean developing our own competence as online educators. But we were not really aware of this aspect while working on the course. We were mainly concerned with the result: producing the much needed course for our tutors. But we realised gradually that we needed new knowledge and experiences in order to develop a course that would meet with new demands.

We have just read a report on staff development in distance education, written by senior consultant Torill Eikaas Eide at the University of Bergen. We agree with many of her conclusions in the report. She believes that staff development is most effective when it is integrated in the daily work of the participants. She asserts that the competence development of the many should happen within the institution as an internal process, closely linked to specific projects where tutors and academics work together. Such an approach will strengthen the motivation to learn and also make learning more effective, she says.

Another aspects of importance for our process, was the fact that the project was given high priority by our managers. We were at liberty to spend time on it, and even give it priority over many other urgent tasks. This made a difference for us, both because the process could flow more easily and because it was more fun.

At the time of writing this paper, the project has not yet come to an end. We have just started the trial phase where ten of our tutors have agreed to go through the course as students, with us as tutors. After this, we will evaluate our own and their experiences. But we can safely say that in these four months we have acquired new competence and widened our horizon as to what it means to engage in online learning and teaching:

- *We have learnt to collaborate on an arena where we had very different frames of reference to start with, and where many matters were new to all of us.*

It was quite frustrating at times, but it was worth it. We know now that we can work together and find solutions even when it seems difficult to find a way out.

- *We have acquired a common understanding of what we emphasise in our teaching.*

An alternative way could have been that our development co-ordinator and our web master had developed a more or less “perfect” course, and given it to us as a finished product, without inviting us into the process. Or that we had been asked to attend a conference on the pedagogics of online tutoring and then encouraged to communicate that new knowledge to our tutors.

We are convinced that such solutions could not have led to the same development of new understanding as we have experienced in this cumbersome and slow process.

- *Different groups of people were drawn into the process*

Some of our best tutors were drawn into the process at the beginning, to help us define the premises for our pedagogical platform. Then more tutors were introduced to the first draft of the course at a workshop some months later, where we invited them to give us constructive criticism and comments. Actually they found the course very useful even at this unfinished stage. At the time of writing this paper, the same tutors go through the course again – before we introduce it to other less experienced tutors. We certainly hope that new tutors will engage in the reflective process that the course invites to; this will help us keep developing the course as we reach new understanding and establish new practice.

Colleagues from other departments within NKS have been enthusiastic about our Four Commandments. Our marketing people have found them very useful for our new marketing profile. We are very pleased to see that our efforts seem to inspire the whole organisation to see the value of a sound pedagogical platform.

- *The course means technological advancement*

As academic course managers we have been concerned mainly with the academic contents and the pedagogical approach in our courses, and we have not sought elegant technological solutions. Honestly, our courses have had a slightly boring look to them.

During the development of the course, our web master has been experimenting with more refined solutions than we have been using earlier. These solutions are now ready to be used in other courses, which means that we can move onwards in this respect also.

Finally, we must say that we had not seen any result of this project yet if we had wanted to be more ambitious. Instead, we move onwards at a pace that is acceptable for us in our busy everyday life at NKS. We strongly believe that this step by step development and collective approach brings us where we need to be, fast enough.

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HOW TO TRAIN ONLINE TUTORS?

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Introduction

Networks, as part of educational technology, are a challenge for learning and tutoring. But only if the users know how to use them both pedagogically and technically. Tutors of online face that effectiveness of online tutoring is highly dependent on how well a tutor can use the technology in the direction of learning objectives. This means that it is not enough for an online tutor to understand the potential and limitations of networks, but also to be familiar with the teaching techniques associated with successful use of IT technology. There is a need to train a new generation of teachers and trainers who work with learners partly or totally online. This paper deals with the challenges of online tutoring.

On-line Tutor Training course

Centre for Extension Studies in University of Turku has carried out two Online Tutor Training courses during fall 1999 and spring 2000. Online Tutor Training is a course meant for tutors and teachers who are tutoring studies in web-based learning environments. The aim of the course was to make the role of the tutor and the tasks of the tutor clear for online tutors. Students used models and ideas on how to guide individuals and groups in web-based environments. During the training students used WebCT as their own learning platform, and at the same time practiced the skills needed when operating as an online tutor.

Cooperation over subject boundaries

Students in these two courses came from subjects as of Public Health Science, Psychology, Education Science, Biology, Environmental Subjects, Cultural History, History and Swedish Language. Part of them were university staff but also part-time tutors from open university studies participated the course. Open university tutors had good face-to-face tutoring experience and they could construct online tutoring based on these previous experiences. For university lecturers it was somehow more difficult to figure out their role and tasks as tutors. Some on university staff were closer to this kind of student support but for some it was too strange an idea to get the most out of this course. Different subjects seemed to work well together and it was seen as a richness in the group.

Learning through reflective practise

Learning by doing was the corner stone of the methodology used in Online Tutor Training. By practising and evaluating their own actions during the course, students got a clearer picture of a tutors role and tasks in the web. In this sense, both good and bad experiences were welcome. During the course, students wrote about their expectations, experiences and did self-evaluations individually and in small groups.

Students created their own action theory

Many of us can share the idea that we learn things best by performing the tasks. At least when we think about skills, this is very true. In Online Tutor Training this was the main principle for the design of the learning environment and for the planning of the learning process.

The methods of the Online Tutor Training course were more important than the theoretical content of the course. Students had to have basic knowledge about tutoring before entering the course. They all had studied Tutor Training for Open University Tutors (4,5 ects) or were otherwise experienced in tutoring in open and distance learning. Teaching and interaction occurred totally on-line and students from all over the Finland were involved. Students had two weeks to become acquainted with WebCT before the beginning of their studies. They got help from the printed study-guide and from the web-based learning environment for exercising WebCT (<http://salima.tkk.utu.fi.public/NetSailor/>). At the beginning of the course students could also receive technical training about WebCT. Only the orientation evening was organised as a face-to-face session simultaneously with an audio-conference. Also technical help was given by phone. After orientation all interaction took place in WebCT.

Reflective practise

The basic principle in the Online Tutor Training was for the students to work as tutors in small groups. Each small group had to plan a given activity of a given subject for other students in the course for one week. A small group of students also moderated the discussion during the week.

During the first week, students presented themselves and described their expectations with another student. This was a start for serious reflection that continued during the whole course. Students were also asked to write their thoughts and reflections during the course in WebCT-tool called My-notes. Based on these notes and reflections students wrote their self-evaluation at the end of the course. In self-evaluation, students compared their experiences about learning and tutoring online to those expectations they had had at the beginning of the course. They also had to think how their attitude towards learning in web-based learning environments had changed and how did they see their role and tasks as online tutors now. Also feedback about this course was asked.

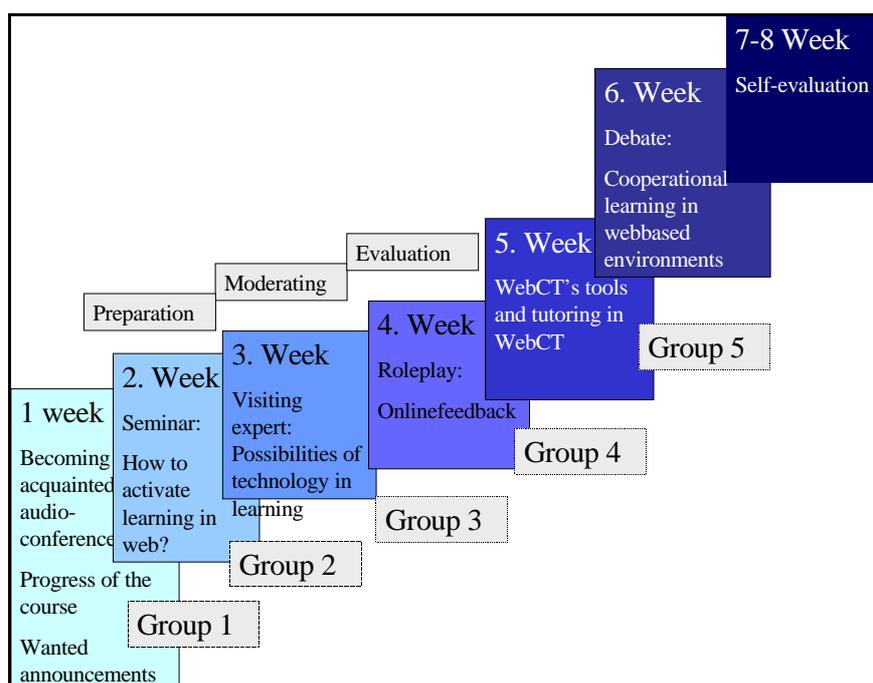


Figure 1. Schedule and contents of Online Tutor Training.

Results & outcomes

Evidence about the learning processes that took place during Online Tutor Training, is based mainly on students' self-evaluations at the end of the course. All students did it as an individual writing so they did not know about others experiences and thoughts. Tutors read, analysed and finally collected a short report of the outcomes (a case study where researches took part in the process).

As a whole, the Online Tutor Training did what it was supposed to do. All students in the two courses said that their thoughts and concepts about tutoring became clearer and more realistic. Students learned how to communicate and activate learning in a web-based learning environment. Also, their idea of online tutoring became more realistic during the course. Expectations of online tutoring had been more positive before the Online Tutor Training than it turned out to be in web-course.

Students own practice with activating methods was seen an effective tool to learn tutoring online. The subjects during the weeks were interesting, with a couple of exceptions. Also the unsuccessful activating methods were seen important, because students felt they had learned from those too. NetSailor was among the best experiences. Students created their own action theory during the course, and in this sense their own experiences as online learners and e-moderators were very crucial. At least students themselves saw the situation like this.

”As a whole, contents that changed weekly and working as a small groups when planning the activities for the rest of the group were pedagogically a good solution. By doing like this the most crucial thing became concrete. And by doing things, we learned in a way that something stays in our minds longer. Reading material is important and deepens understanding.”

”With the help of example weeks we could see in a very concrete level what works and what doesn’t. We saw how we should plan the studying so that it won’t be only surfing in the net. Maybe I would like to have even more concrete things but it worked also this way.”

Challenges of online tutoring

Online tutors face many challenges in their work. The most obvious are the content related matters, and supporting students in their learning process. Even greater challenges, however, lie in activating the students to work as a group to get the best out of their efforts and working in a web-based learning environment. It is not too difficult to present information over a distance, but getting people to participate and making learning active at a distance is much harder. It is not enough if excellent web-based environments and materials are available. If learners do not actively use them, the whole learning becomes questionable. “The single most important skill that all distance educators must develop is to make their students active participants in their educational program.” (Moore 1996.) Moore’s statement is still a real challenge also for tutors of modern information technology too. Online tutoring does not differ much from tutoring in a more traditional context, if we think the basic aim of it. When operating in networks, there only seem to be some special questions dealing with technical skills.

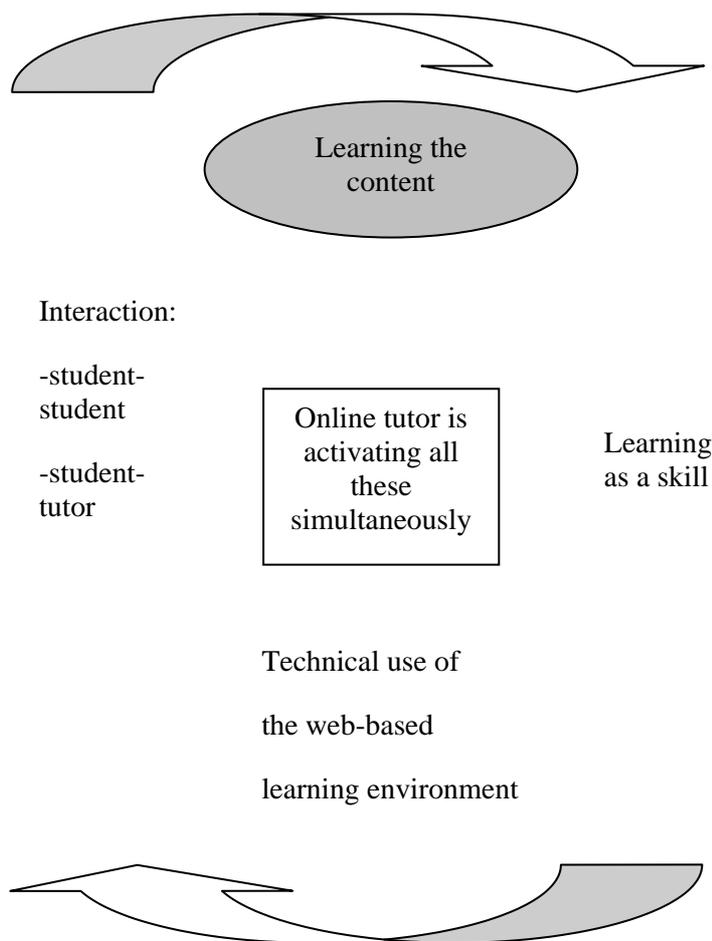


Figure 2. Tasks of an online tutor.

Future visions

There is a growing interest to this kind of online tutor training also internationally. It is obvious that after choosing a suitable platform for an organisation and after material production questions concerning student support, tutoring and staff training must be the topics if quality of learning is seen an important aim. Traditional face-to-face tutoring and online tutoring seem to be the two future forms of student support. Asynchronous and technology distributed learning will not substitute synchronous and face-to-face tutoring. Structurally online tutoring and face-to-face tutoring are different forms and tutors need different skills in using these structures. (Bernath 2000.) Existing experiences from face-to-face tutoring are a good basis for restructuring the role and tasks of an online tutor. But it seems this is not enough.

Mary Thorpe (2001) speaks about totally online teaching where the purpose of the online interaction is to use the learners themselves as a resource rather than use CMC as something just added-on to previous courses. The pedagogical design of these kind of courses builds on a constructivist approach to teaching and learning which changes also the course design model and principles of distance education used in online learning. "It takes considerable ingenuity to design appropriate educational goals in order to achieve a course where interaction online is absolutely essential in order to pass, rather than a highly desirable enrichment" (Thorpe 2001). Also the used tutoring model in online courses needs to be developed further. At the moment it seems that mainly the face-to-face tutoring models and structures are transferred into web-based environments. Obviously there are also new structures available in web-based environment. For example different student numbers combined with different activating methods in web-based environments are worth testing.

Global teaching and distance education is one of the future challenges to be answered too. International course design and cross cultural participation will increase the need to support larger amount of students simultaneously within the same course context. Inter-institutional cooperation will be a future model to put both course design and student support into practise. Interesting question is how to maintain personal and local point of view in student support and at the same time carry out cost effective international courses where teams of experts and tutors work in flexible learning environments together with students. Web-based learning environments will be at least part of these flexible environments and thus experts and tutors need new skills to be able to operate in these modern learning environments.

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FLEXIBLE LEARNING – A WIDER CONCEPT FOR THE TEACHERS

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Introduction

Open and distance learning is a true challenge for the whole organisation. In addition to the immense impact of modern information and communication technology its demands and changes will be radical. All this brings on many changes for the roles of the teachers, students and management.

The challenge for a modern organisation is how to cope with demands based upon individual student needs. Within a concept of flexible learning teachers should focus on tutoring and the role of the student should change from the traditional passive receiver to the active seeker who demands individual solutions.

In this paper we will present some thoughts based upon our experience from adult education and training, mainly on upper secondary level. We have many years of experience from working for the Swedish National Institute of Distance Education, planning and carrying out different scenarios of flexible learning and developing training programs for teachers in distance teaching methods.

It is not just a course – It is a concept

When one plans to launch an ODL-course it must be based on a process that involves the whole organisation. The shift to a different kind of educational offer as well as a different method of teaching and learning can be very painful and lead to restraints if not everyone concerned has been involved. *What do we want to do, for whom and why? In what ways and by what means and methods can our organisation support the individual process of learning?*

This means a different and widened role for the teachers. The teachers' involvement in designing course models, choosing format between i.e. printed study material or web based courses, writing study guides or even plan and administrate will be vital parts of this extended role. The more flexible a course is and is carried out, the more responsibility for the administration risks to land on the teachers. A shift from teaching to tutoring and thus a more supporting and less lecturing role is anticipated.

A total independence of time and place will lead to a delicate choice for the teachers between pacing the students at all or in a subtle more direct way. The latter could be done through timelines, which will stipulate when different assignments have to be completed and turned in.

This independence of place and time is one way of assuring student autonomy, but what other methods of creating student autonomy will be needed?

Computer literacy is an important skill of teachers engaged in ODL. Throughout Europe many teachers don't have access to a computer of their own and have of course not the possibilities to get as skilled as needed. To be able to design web courses to be distributed over the Internet, teachers

will need to know what treasures there are to be taken advantage of. And it will be important for them to imagine how the students will react to different new exercises and means of introducing subject matter.

This orientation of new media doesn't mean that the teachers themselves should be the masters of different digital presentations, but they must have the skills and knowledge to monitor the development process.

New models of learning need new models of counselling. Counsellors play a key role in all well developed models of ODL. Although counselling is a profession of its own many questions and tasks in this field will be addressed to teachers, since they have the closest contact with the students.

It is essential that the college has a good communicative structure for counselling and that ICT-tools can be used for this purpose.

A group of students coming to school every day create the need of one type of administration - registration of presence, information and counselling, handling of economic support etc. The other extreme - students scattered all over the country, not belonging to any group - will create a need for a much more elaborated administration. Other tasks that will affect the teachers involve the need to keep track of the students and their results in a database. Somehow logins have to be distributed, telephone and videoconferences have to be booked and so on. All these chores call for a skilled and service minded technical support at school and a special helpdesk to turn to for the students. This really should go without saying, but often it has shown amazingly difficult to take these organisational steps.

All work in a process of change has to be voluntary, based on an acceptance for the need of change. Teachers involved should never be forced to co-operate or left without options. The new initiative should be managed from a pedagogic initiative based upon teamwork, where teachers play the main roles. The projects should emanate from a well-defined plan.

In all organisations there are enthusiasts who can work hundreds of hours, unconsciously challenging and threatening their colleagues, neglecting their personal life. At some point they can find them-selves in a state of turmoil, when the energy suddenly vanish. It is the duty of the management and colleagues to take care of these enthusiasts. The enthusiasts are valuable assets to the project but need special and tender coaching. And the adopters, who don't want to invent the wheel again, but to find ways to introduce new methods through models created by others, also need to be considered.

An important first step when developing new courses is to form a course team. It cannot be expected from an ordinary teacher to cover all the skills that an advanced web based course demands. There are also many skills needed to design good printed material. Among the experts needed in an advanced course development team an instructional designer, a subject expert, an artist, a technician, a multi-media expert and a programmer can be mentioned. Creating teams like this will affect the work of teachers to a more collaborative direction. It is also very important to repeat that the initiative in the development Sprocess always has to be held among the teachers involved. Too many examples of failed projects lead by eLearning hyped technicians can be told!

There are a few characteristics that a good ODL course usually contains: A model, or rather, a mixture of face-to-face and distance education elements is the design that sets the standard and nature of the whole course. On the other hand does the definiton of the good dialogue not always mean a fysical meeting. It is important to point out that it is mainly the good thinking and planning behind a learning situation that sets the standards of quality, not the form of contact itself.

There is usually a choice of ICT-tools. They range from simple telephone conferences and e-mail facilities, to technically very well developed electronic learning environments (ELEs) or educational platforms. The study guide is the backbone in every well-developed course. They build on a tradition going back to the old correspondence schools and their expertise in constructing study guides. Many times they were the only teacher/tutor students had where no other options existed. Assignments are next to the study guides the most important parts. In addition to these the importance of qualified tutoring must not be underestimated. They can all vary a lot but they are a very good quality indicators. Exams are important parts of the learning process and should be developed as an organic part of the whole course. In the design of the course the exams need extra attention and decisions about the values of assignments in relation to exams is an important part of designing the course model.

When producing study guides the three questions To Whom? What? Why? and When? have to be answered. The structure and approach can vary a lot according to who the user is and for what purpose and when he or she will use the study guide. There are mainly two common approaches to write study guides. The first is to write a guide with a built-in teacher and the second is to write comments to a textbook/reader. In the first case the guide can become quite voluminous and may tend to become too big. But a good such guide can create the kind of personal touch and relationship, which very often is the quality, needed for success. Comments to textbooks or readers are often the most time efficient method in a short perspective and is often the most plausible way for someone working with a normal budget. This is recommended in models where face-to-face meetings are mixed with distance learning periods which also is a common beginner's method.

From Börje Holmberg, the legendary Swedish distance educator, we have interpreted the characteristics of a good study guide as follows:

Clear, easily readable language
Not too much information
Explicit advice about what to do and what to avoid
Invitations to an exchange of views
Attempts to emotional involvement
personal style; pronouns – conversational
Suggestions for time strategy
Well structured; print, voices etc
Lead to pleasure of studies
Create a feeling of involvement and belonging/partnership
Friendly tone

Professor Holmberg pinpoints the need for a "*guided didactic conversation*" and stresses the importance of "*a tone of friendly interaction*" in all learning material.

A lot can be said about assignments. Only a few points will be made here. First of all: The assignments are an important part of the learning process and aim at linking together students and teachers and thus support their interaction. They should not be "personal study points" or questions to the just read chapter in a reader. Consider self-checking exercises when possible! The students should handle easy facts themselves, making it easier to save the valuable teacher time for more complex concepts and thoughts. There should be a conscious mix of the assignments aiming at promoting different kinds of knowledge. The Swedish national curricula try to separate knowledge of facts from skills and understanding and knowledge based on familiarity from each other. In good ODL-courses there should be a mixture of these different forms of knowledge in the assignments. As a general orientation the assignments should avoid asking for simple facts and instead aim to abstraction and synthesis.

Essential to all new initiatives is the feeling of consensus and belonging among all involved. Teachers are very keen on seeking knowledge and the best way to engage and get enthusiastic teachers, team-participants etc. is to offer them a course before they are assigned their first new course. A foundation course could contain matters like orientation, definitions and concepts, opportunities to sample how to work within an electronic learning environment and a concluding report. The idea is to create a learning situation for the teachers similar to the one the future students will experience. Through this there will be an element of "learning by doing" by which the teachers will learn about the pitfalls and the critic phases of a course. They will also get an opportunity to use new media of different kinds. In the concluding report the teachers can be asked to sketch a course of their own or to evaluate an existing online course in their own subject. Eligible to participate in the course are all teachers, regardless of teaching subjects. The only prerequisite is some skills in how to use e-mail and manage files.

Summary

The changing role of the teacher in a transitional world can threaten and bring expected and unexpected hardships upon colleagues and management. Anticipating the need for better computer skills among the teachers, the creation of course development teams, technical support and backup is of crucial importance in this process. But linked to these measures the teachers must be offered to take part in method training courses. Organising and offering flexible learning must be based on full understanding of the process of learning. The learner interacts with his tutor, literature and other teaching media, fellow students and his own environment. In interaction with all these, facts and information are processed into knowledge. The mission for the organisation must be to find ways and means to develop structures and methods to support this process in which the teacher and the tutor has a key role. Without openness in all these respects not very much will happen.

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THE INTERNET AND THE EDUCATION SYSTEM: AN OPTIMIZATION POLICY

THE NEW RECOMMENDED POLICY FOR THE INTEGRATION OF THE INTERNET INTO THE EDUCATION SYSTEM IN ISRAEL

A. Aviram, U. Melamed, M. Gal,

1. Introduction

The aim of this paper is to present a new policy for the integration of ICT into education now being formed in Israel. We will be grateful for any comment that will help us in the new (hopefully) promising and (certainly) dangerous journey we embark upon. We will also be glad to seriously consider expressions of interest in sharing this journey with us - either theoretically or practically.

This policy was recommended by the Steering Committee for the computerization process. The committee was formed by the Department of Science and Technology in the Ministry of Education (in charge of the computerization of the Israeli education system). The policy is being now further developed and operationalized by the Advising Academic Committee alongside the Israeli Computerization Program (Henceforth: – “the recommended Israeli policy”).

The special nature of the recommended Israeli policy stems from its combination of what might have been seen as two prima-facie contradicting elements. The first is its support for radical change of the educational system conceiving it to be part of a whole inevitable cultural change from print-oriented culture to cyber culture, or- from modernity to postmodernity. The second is the ideological commitment it starts from, calling for attempts to channel the inevitable development of ICT in education and what it take to be the necessary “conquest” of education (still very much dominated by print-oriented culture) by cyber-culture in light of the three basic values of liberal democracy – the enhancement of autonomy, morality and belonging.

We believe that:

- Radical ICT-oriented change is (now) inevitable,
- This radical change has a double-edged potential impact from the perspectives of the basic democratic values,
- Although inevitable, the mode and patterns of this change can be partly influenced by concerted social policy,
- The educational system is the best lever that can be used by such policy,
- Therefore educational systems in democratic societies should do their best to channel the inevitable process of the computerisation of education so that it will optimize the impact the Internet will have on education, on young people’s development and hence on society at large.

In what follows we will first distinguish between the basic views on ICT and education: the Technocrat, the Reformist, and the Holistic views. Then we will characterise the Israeli policy as a holistic policy and point to its two complementary basic starting points. We will proceed then to further elaborate on the above credo of the Israeli recommended policy and end by pointing to some of its tentative practical recommendations. We hope that although we only start our way, these practical recommendations will give the readers some concrete idea on the direction to which the recommended Israeli policy is heading.

2. Three Views of ICT and Education

Views of ICT and education can be characterized in light of two parameters. These parameters refer to both “ends” of the thinking process about the issue of ICT and education: the starting point and the end point. The first parameter concerns mainly *approaches* one adopts regarding the aims and/or the nature of

the computerization of education. The second parameter refers to *attitudes* one adopts regarding the nature and extent of the changes in prevailing schools conceived as necessitated by the introduction of ICT to education.

Within the first parameter it is possible to distinguish between seven approaches: the administrative, the curricular, the didactic, the organizational, the systemic, the cultural and the ideological.

The administrative approach consists mainly of the desire to achieve a certain ratio of computers (or other kinds of equipment) to students. It sees the sheer existence of technology as a progress and as an important aim.

The curricular approach stems from the conception of technology as serving some specific curricular aim in the given school curriculum and structure.

The didactic approach stems from the conception that the introduction of technology can lead to, or necessitates, the introduction of a new research oriented, constructivist didactics, or teaching/learning methods..

The organizational approach is quite often connected with the previous one and is based on the understanding that the introduction of ICT to schools, leading to research-oriented and hence necessarily more flexible teaching/learning, should involve organizational changes in schools turning them to more flexible organizations.

The systemic approach characterizes those who believe that didactic and organizational changes in school will not be possible without systemic changes, and that the merging of ICT and education requires (at least) organizational changes on the level of the whole system.

The cultural approach the recognition that the ICT revolution is a deep cultural revolution, changing all modes and patterns of our lives, and hence bound to lead to dramatic changes in education.

It is characterized by its recognition of two basic facts:

- ICT has a powerful defining impact on all important aspects of our lives and hence our culture (in terms used often in this context it is a “defining technology”);
- Besides the awful transforming power it has in itself, the ICT revolution is only a part (although certainly an important part) of a group of intertwined revolutions that, in the past twenty years, have been transforming Western culture from a modern into a post-modern culture.

The adherents of the cultural approach maintain that educationalists should be aware of these two facts, and strive to adapt the education system to the new culture.

Different people can judge cyber-culture or, the post-modern situation differently, in light of different or opposed values. Hence the need for the ideological approach. Here we face a totally new stance towards the issue: while all the previous approaches kept to descriptive language (at least on the surface) and refrained from an explicit systematic judgment of the post-modern situation cyber culture, this is exactly the starting point of the ideological approach. It starts from those basic values that are considered (by the upholders of the different variations of this view) as setting the most basic social and educational aims, judges the social cultural and educational situation in their light and strives to fulfill them in the best possible way through (in our case) the educational process.

The second, parameter reflects the attitude one adopts regarding the kind and the level of change that the merging of ICT with education will, or should, lead to. Within this parameter it is possible to distinguish between five attitudes: the agnostic, the conservative, the moderate, the radical, and the extreme radical (or the de-schoolers’ attitude).

The agnostic is the attitude of those who do not have a clear opinion as to the impact of ICT on education.

The conservative is the attitude of those who believe that schools will, and/or should, survive ICT with minimal change, as they have survived other technologies (television - is the most often mentioned in this context).

The moderate is the attitude of those who believe that for the sake of the integration of ICT, schools are about to (or should) go through an extensive change in their didactics towards more active problem-based learning.

The radical is the attitude of those who believe that schools are going to radically change in all their parameters, or have to go through such changes if they are to survive the ICT revolution.

The extreme radical (or de-schooling) attitude is the attitude of those who believe that ICT is a Trojan horse inside the base of the prevailing educational system, and that the latter will not (and quite often also: should not) survive it (Aviram, 1999e).

As for the logical relationships between the two parameters, there are some overlaps between approaches and attitudes. Some approaches lead more naturally to some attitudes than to others, while there are some intersections that are logically impossible. In a recent paper (Aviram and Talmi, 2001), we analyzed various representative texts dealing with the question of ICT integration in education, examining their approaches, attitudes and the combinations between them. These texts were deliberately chosen to reflect the existing implemented views in all age levels, including different national policies, and theoretical views.

We have reached the conclusion that on the whole, it is possible to group most of the papers analyzed (and hence the processes of the integration of ICT and education described or recommended by them) to three larger groups, or paradigms. We chose to call these paradigms (not totally hiding our biases) the Technocrat, the Reformist, and the Holistic.

The Technocrat Paradigm: characterizes those who avoid any discussion about school change. This group includes all the papers classified as having agnostic attitude, and also almost all papers reflecting administrative, curricular or didactic approaches combined with a conservative attitude.

The Reformist Paradigm: according to this view ICT is seen as a tool that can assist in promoting the “right”, “interdisciplinary”, “constructivist”, “collaborative learning” didactics. The papers reflecting this view can be classified as didactic-moderate and organizational-moderate.

The Holistic Paradigm: Unlike the two previous groups, the authors of the papers classified in this group usually present an explicit set of assertions regarding the socio-cultural situation and the part ICT plays in it (cultural approach). They also have an opinion as to the desired values that should guide educational decision making (ideological approach). Included in this group are those who hold conservative attitude (e.g. Postman, 1995) or radical and extreme radical views (e.g. Aviram & Comay, 2000; Kristmundson et al., 2000).

The three paradigms are distributed differently among the analyzed texts. Most of them present the first two paradigms, including a text describing 25 national policies.¹ The third paradigm, the Holistic paradigm, is quite rare. Mostly academics, intellectuals, or futurists, individuals oriented towards philosophical or critical social thinking - hold it.

¹ There is not much point in giving examples for these approaches – many thousands of papers and books have been written in their light in the last few years. Just going through the proceedings of any recent conference on ICT and education will provide the reader with a large number of examples. See, e.g., Information Society Directorate General of the European Commission & Finnish National Technology Agency, 1999, *Summary Proceedings: Information Society Technologies, Conference and Exhibition*, Helsinki, November 22nd-24th; EUN, 2000. *Proceedings of the EUN Conference: Learning in the New Millennium*, Brussels, March, 20-21; The Open University of Israel and the European Commission, 1999, “Technology in learning Environments: The Learning citizen”, Tel-Aviv, October. See also EDEN (European Distance Education Network) website for other proceedings: <http://www.eden.bme.hu>

3. The Recommended Israeli Educational Computerization Policy

The Israeli recommended policy is based on the *Holistic* Paradigm. As such, it is quite unique: (the analysis of the text describing the policies of 25 nations didn't reveal any other nation that holds the Holistic Paradigm).

As calimed in the introductory section, his policy stands upon two complementary pillars. The first among them consists of the perception of the ingration of ICT and education, from a *cultural approach* concieving it to be a radical cultural and organizational revolution requiring schools for a deep transformation(as oppose the way it is being usually concieved- the introduction of neutral technology into schools as they are) . The other pillar is our *ideological approach* reflecting from our view that this revolution though necessiated by the radically changing circumstances of the cyber culture or knowledge based society- should be carefully ideologically and ethically scrutinezed and guided as far as the educational system is concerned by basic social values (as opposed to the usual conception of it- as a predetermined process necessarily leading to progress)

The main practical policy recommendation stemming of the first startign point of our policy is that schools must become, or inevitably will become, much more flexible. Otherwise, we believe that schools will not be able to continue their role as a socializing agent in the new post-modern, ICT based culture . (Aviram, 2000)

This process towards flexibility embraces such fundamental elements as time, place, role definitions and content. With regard to the time and places, the flexibility process means that the new school will not be committed to "lococentrism". It will rather offer its students opportunities for distance-learning and non-synchronic learning. The change in roles' definitions means, among other things, that school will offer its students different kinds of educational support – by teachers, mentors and guides. It also means that the role of teaching will be open to new people – coming from outside school (other students, local citizens, retired professionals,') . The Internet may be a source for many possibilities of new teaching figures outside school.

The change with regard to content means that the compulsory content should be minimal, and most of the content should be open to the students' choice.

This starting point, make us seriously consider the following quesions:

Given the long history of failures of educational reforms all over the world schools it reanable to assume that schools could be transformed into much more flexible institutions?

If yes, how should such a process be managed?

We are very far from certainty concerning the answers to these questions. We cannot avoid asking them- given our belief that if schools will not radically adapt themselfe to a world dominated by virtual/knowledge-based/crazy organizations and processes they doom themselves to become the option of those who don't have any other option.

We also believe that the radical change of schools' structure will be long, painful and difficult. Thus we are thinking on encouraging schools to move on the path of flexibility in their own pace and mode. We contemplate encouraging schools to undertake painful changes, by offering differential support, according to the scope of flexibility they will be committed to.

We have briefly presented here the practical policy recommendation stemming from the first starting point. In the next section now will focus on the second starting point (we are now in the process of writing another paper on the first starting point) .

4. The Democratic Values and their Bearings on the Evaluation of the ICT revolution

The basic values underlying the ideology of the Israeli policy are the basic values of liberal democracy, which are the enhancement of liberty, equality and fraternity in society at large.

According to our view the educational derivatives of these general democratic values that seem the most natural and fundamental to every democratic society, are the development of autonomy, morality and belonging in young people. In what follows we will briefly present our understanding of these values and their educational implications.

The value of autonomy is composed of authenticity and self-direction. By "authenticity" We mean the individual's ability to be aware of his/her feelings, desires, interests, talents and characteristic styles of activity and learning, and to adapt these to one another. "Self-direction" refers to the individual's ability to rationally form action plans and realize them.

"Belonging" is perceived as referring to the individual's conception of himself/herself as being involved with/committed to social groups.

"Morality" is understood by us to be the individual's awareness of the need to avoid hurting others. (Aviram and Bar-Lev, 1999)

As far as education toward these values is concerned , we believe that these values are best formed through the individual's experience of real, voluntary chosen situation, occurring on all essential levels of human life, accompanied by a thorough process of guided reflection on these experiences.

This process of reflective "experience in living" should be characterized by four basic principles. The first three principles - flexible freedom, plurality of experience and physical and emotional security, are mainly the characteristics of the appropriate environment. The fourth - enhancement of reflectivity in light of a detailed systematic methodology, is the characteristic of the appropriate didactics. (Aviram and Bar-Lev, 1999)

Flexible freedom is what enables individuals to construct an environment that suits their own wishes and needs, and to change its components according to need stemming from their personal development.

Plurality of Experience refers to the existence of many different categories of experience as possible.

By Physical and Emotional Security we refer to lack of threat of being physically damaged, the certainty of being accepted by the environment, and the stable and sequential nature of it.

Guided Reflectivity consists of the encouragement of individuals to identify and respect their wishes, talents, styles and emotions (authenticity-oriented reflectivity) on one hand, and the ability to form rational plans and implement them (self-direction oriented reflectivity) examine and justify their activities, on the other.

Once formulated our basic values and their educational bearing we have to proceed to the evaluation of the ICT revolution in their light . We believe it to be double edged from this point of view, i.e. as having both potential positive and negative impact on individuals' chances to develop as autonomous, moral and belonging human beings.(Aviram, 2000)

1. Thus for example, being hypertextual and multimedia based, the ICT revolution is changing our ways of thinking and learning, making them more lateral, associative and visual. In doing so, it is probably enhancing our imagination and creativity, -which can certainly contribute to one's ability to live autonomous life based on self fulfilment . At the same time it may also threaten the dominance of the linear, logical, abstract structures which have ruled Western culture in the past 2500 years, and which are vital to any process of reasoning and criticism which in turn are basic to our concepts of 'autonomy' (and "morality"), (Negraponte,1995; Hirsch 1987).
2. Or- being audio-visual, and including constantly improving speech and written text-recognition applications, the ICT revolution will probably render much quicker and more efficient all the functions that now require reading and writing, to an extent that might render reading and writing redundant in many cases. Hence, it is likely to diminish the importance of literacy in society. (Birkerts, 1994). This in turn might open the door to more equality among individuals endowed with different Intelligences (to use Gardner's term), and might contribute to the values of belonging and morality basic to our vision. Nevertheless, it might also encourage even further the demise of

rationality, which has always relied on literacy, and hence have a negative contribution to the value of autonomy also basic to our vision . (Hirsch, 1987; Hough, 2000).

3. Or, to give the third and last example, since it facilitates immediate connections among individuals throughout the world, the ICT revolution is bound to extensively facilitate individuals' ability to connect on the basis of similar interests, quests or problems, and thus will have an important empowering effect and enhance individuals' chance for self expression and hence autonomy. In doing so, however, it also exponentially multiplies the number of relationships one has, and renders each of them more superficial, fragmentary and temporary, thus perhaps contributing to increasing emotional "flatness" and saturation, which in turn lead to the disintegration of the self and thus prevent one from having any chance for autonomy (Gergen, 1992).

Enough have been said we believe to convince the reader that when evaluated in light of the basic values of Liberal Democracy ICT has the potential of being a double edged revolution. Because we acknowledge advantages and disadvantages in light of our ideological principles, we need to know: whether the ICT revolution is deterministic or can we influence it (– to an extent, at least)?

Our view is basically an indeterminist . Our indeterminism is a "soft" one– since we assume that the mere fundamentals of the ICT revolution are given, but we also believe it is possible to channel the processes based on them, at least to some extent.

Being soft determinists we believe that there is a chance that the ICT revolution and its “merger” with the educational system (which as claimed above we deem to be necessary) can be influenced in a direction desirable and fundamental to Humanistic and democratic societies

5. The Optimization Strategy Basic to the Recommended Israeli Policy

In order to balance the perils of the Internet from the perspective of the basic democratic values and benefit from, and maximize, its advantages from the same perspective, we have formed an optimization strategy. This strategy consists of two basic elements:

- Free access to the Internet from everywhere to all Israeli children
- Forming this access in an indirect way which will make the students “pass” and be “accompanied by” intermediate portals

We believe that the first element will serve, in the best way the three first elements of the education towards the democratic values: Freedom, plurality of experiences and security, while the second, *if mindfully planned and managed*, will be able to serve the fourth (reflective tutoring) and to equip students “en route” to the Internet with tools necessary for the development of autonomy morality and belonging

We further believe that the two above elements balance each other and consist the best possible strategy for exposing young people to all the infinite range of opportunities and experiences accessed through free and secure access to the Internet, while, at the same time, not losing a secure and stable point of reference and accompanying framework which will defend them from the excesses of the Internet and help them make full productive use of it

Our recommended operational model is based on three basic characteristics:

- Free connection to the Internet for all students from their schools and if possible from everywhere.
- Connection to the Internet as an indirect connection- making the users go through local and national portals.
- Careful methodological design of the intermediate portals in light of the major objective of the educational system: the development of the users' personality in light of the three basic values (and hence stemming sets of attitudes, capacities and skills) - personal autonomy, morality and belonging.

In order to meet the requirements of the third of the above characteristics, the portals should be designed in order to balance the excesses of the Internet and equip young people with necessary tutorship , knowledge and awarenesses to productively deal with them .

The following characteristics of the intermediate portals could help in meeting this requirement:

- As far as Interfaces are concerned
 - The interface should be simple, clear and “quiet”. It will not include advertising and will present its content mostly in a linear fashion.
 - The interface will be “smart”, adapting itself to users with different needs, styles or disabilities.
- As far as the contents included in the intermediate portal are concerned
 - There will be local and national portals.
 - The national portal will contain a library of knowledge in various disciplines, and in their complementing meta-disciplines: philosophy, history and sociology.
 - The local and national portals will be oriented in both their content and form towards constructivistic research oriented learning.
 - Both local and national portals will be rich in forums and interest groups, encouraging virtual communities and belonging.
- As far as technologies included in the intermediate portal are concerned
 - These portals will be based on individual smart agents that will track users, model them (mainly their interests, learning and performance styles, cognitive and rational strategies), reflect the models to the users and dialogue with them - in order to achieve enhancement of their self-knowledge, ability for rational learning and decision-making (as required from our understanding of autonomy).
 - Other, collective-smart agents will matchmake between users that will have similar interests, problems or aims (as required by our understanding of belonging).
 - The individual smart agents will accompany the users both in the intermediate portals and, more importantly, on the Internet.
 - The intermediate portals will enable users to download smart, autonomy and belonging-oriented, authoring tools and to meet in meeting rooms based on 3D environments or through conference applications or both
 - They will also include applications for the graphic and 3D presentation of individual and collective knowledge as a means of the formation, examination and distribution of knowledge.
- As far as accompanying services are concerned
 - The first category of accompanying services to be found in the intermediate portals will consist of forums supporting users in the main fields of life - fields of interests, career and family/community. These forums will contain information, courses and on and off line counseling services.
 - The second category of accompanying services will consist of “counseling corners” in cognitive and emotional issues that have to do with learning and development.
 - The third category of accompanying services will be aimed to guarantee equal access to the Internet and the intermediate portals – by making sure that every student in Israel will have the know-how of mindfully using them

The above characteristics of the basic model and the intermediate portals were chosen in order to meet the requirements of the three environmental principles and the fourth didactic principle of democratic education stemming from the three basic educational values. The free connection to the Internet serves mainly the principles of Flexible Freedom, Plurality of Experiences and Physical and Emotional Security. The characteristics of the intermediate portals promote mainly the principle of Reflective Tutoring. For example, the smart agents will facilitate the principle of Reflective Tutoring by reflecting to the users their own interests and styles and dialoguing with them on these issues

Conclusion

In this paper we have presented the recommended policy of the computerization of the educational system in Israel.

As we have said at the beginning, we are just making our first, somewhat hesitant, steps in the above directions both theoretically and practically . We will be grateful for any comments that may help us improve the recommended policy, and for expressions of interest in forming partnerships in the creation of a new ICT based foundation to education in liberal democracies.

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MEDIA COMPETENCE AND THE EUROPEAN CENTRE FOR MEDIA COMPETENCE

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Media competence in a media society

Media are omnipresent: every day, we work with media, and we educate, inform, and entertain ourselves with and via media. Almost everything we know about the world, we know from the media. Future social and technological developments will put even greater emphasis on the importance of the New media for our roles as employees, consumers, and citizens. "Teleworking", "online shopping", "e-learning", "new job opportunities" are some of the catchwords mentioned in the context of current developments. Others - not quite that positive - are "social segmentation" or "digital divide" when possible consequences of these developments are discussed.

Thus, on the one hand there are those who can afford and know how to use the new information technologies, or who have adequate prerequisites to learn appropriate skills to carry out their tasks at work. On the other hand there are the groups for whom, for a wide variety of reasons, this is not possible. These groups threatened with exclusion include, e.g., young people who, owing to their social origins or their failure to obtain educational qualifications, have hardly any prospects of getting a job, and also older people whose working lives have come to an end. While socially-disadvantaged youths are in danger of gaining no access to information and communication technologies either in their private lives or in their jobs, the senior citizens of our society are being affected to an ever increasing extent in their everyday routine tasks, whether these involve bank transactions, online shopping, or the utilisation of other such services.

Generally speaking, we are currently in a phase of upheaval, both in society and in the media. New media are taking up a key position in a society that is becoming increasingly based on the processing of information and knowledge. Terms such as information or knowledge society are commonly used to indicate this societal development.

Different terms are in use to describe the relation between the individual and the world of media, depending on various cultural, linguistic and historical backgrounds: "Media literacy" as "a perspective from which we expose ourselves to the media and interpret the meanings of the messages we encounter" [1][2,3], but also "(multi-)media competence", "network literacy" or "digital literacy" are concepts mentioned with regard to the New or digital media.

The term "media competence" is embedded in various societal discourses and refers to far more than media education.

In the following the concept of "media competence" (or "Medienkompetenz" [4]) is proposed as a general term which relates to all forms of technical media be that traditional print or digital multimedia. The argumentation is based on the current German discussion but probably shows similar results with regard to related terms.

Media competence usually means the individual's ability to move about the world of the media in a critical, reflective, and independent way, and with a sense of responsibility, using the media as a means of independent and creative expression. Media competence signifies active awareness of the media, and their efficient utilisation and creative arrangement. The term itself remains vague although it is used very extensively in essays, articles and political programmes.

Authors from the fields of education, economy, media industry or regulation usually distinguish a number of different dimensions or levels of media competence, for example media usage, media creation, media critics and media ethics. In the various pedagogical, economical, media regulatory etc. discourses the term media competence fulfils different functions. Different societal areas (education, economy, legislation) stress different aspects and dimensions of the concept. Media competence is far more than just a

pedagogical objective regarding a critical and self-determined citizen. Demanding media competence implies different societal imperatives.

- Discourses in media pedagogy: “Media competence“ offers an up-to date emancipatory objective to media education and gives reason for historical self-addressed pedagogical discussions ("media competence is nothing new!"). Furthermore it provides self-assuring means to dissociate from shortening technocratic discourses („media competence is more than media usage!“).
- Discourses in professional education: “Media competence“ is an important factor to guarantee economic competitiveness. In vocational training the term “competence development” does not content itself with dimensions of how to use media, but ‘holistically’ demands progression in social and individual competencies as well. This seems to be the only way to efficiently make use of a labour market’s potential that is ‘fit’ enough for the challenges of the information society.
- Discourses in socio-policy: „media competence“ provides media economy policy with a modern key concept to secure the economic position. In the hazardous frame of a social split-up („digital divide“), political-economic and socio-political discourses merge. On the one hand, the non-participating part of the split means a potential on the market that is in danger to get lost. On the other hand the social division of “information rich“ and „information poor“ livens up the socio-political normative discourses on equal opportunities as well as the maintenance of a critical public in relation to the media.
- Discourses in media legislation and media regulation: „media competence“ in its double sense of responsibility and ability describes and guarantees the continuation of a discussion regarding media regulation. In view of the New media developments the term furthermore offers media policy making bodies a disputable option to transfer regulatory problems from the legal system to the educational system.

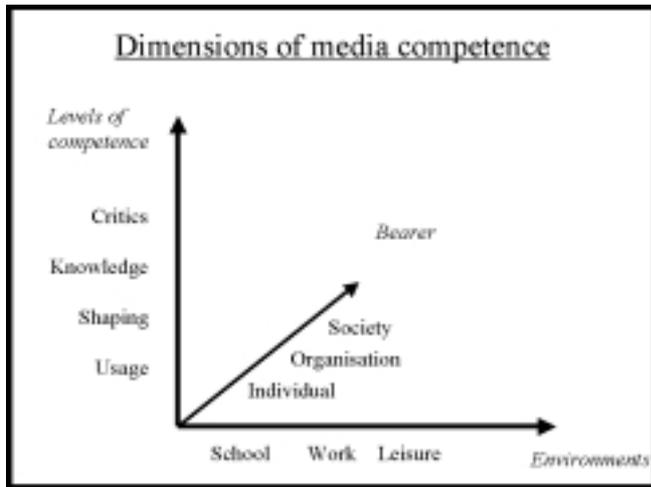
The handy buzz word “media competence” is being “colonised” by different societal pushes. The complex crossroads of pedagogical, economic, legal, technical and political discourses and imperatives transcends any individually conceptualised media competence. Fostering and developing media competence exceeds the borders of a single societal area such as the education system and requires co-ordinated actions on interfaces of different societal areas including institutions working in these areas.

The discourses surrounding the fashionable term of media competence are coined by different social interests - the development of media competence must sufficiently take these complex overlaps and crossings into account. After all, the intensified discussion on the term media competence itself is a phenomenon and a construct of the mass media in society. Media do not reflect an external reality, but they construct a world that then becomes the reality society orientates towards. And the demand for more media competence is reality in the media.

The increasingly audible call for more media competence in political speeches and action programmes is - and this is as well increasingly observable - taken as a reason for critical reflections on the relation between media policy and media economy. The demand for more media competence could be unmasked as a sign of resignation with regard to the growing influence of globally operating media enterprises, the breaking up of knowledge gaps and digital divides, and the rapid technical developments. The reduction to the abilities and skills of media users and the appeals to the recognition of self-responsibility on the side of the recipient can be interpreted as answers to social dynamics in our media society. Media competence seems to become a kind of individualised regulative in a de-regulated world of media.

Taking media competence as a key concept in the information society makes a multi-dimensional approach necessary.

The complexity of the problem of promoting media competence in our society tends to be shortened and inadequately reduced when referring only to pedagogical challenges. In fact, understanding media competence exclusively as an individual’s ability means to ignore the necessary developmental processes on organisational and societal level. While the education system naturally focuses on individual’s abilities, it is under too great a strain when it comes to the implementation of media competence as a key concept in the information society.

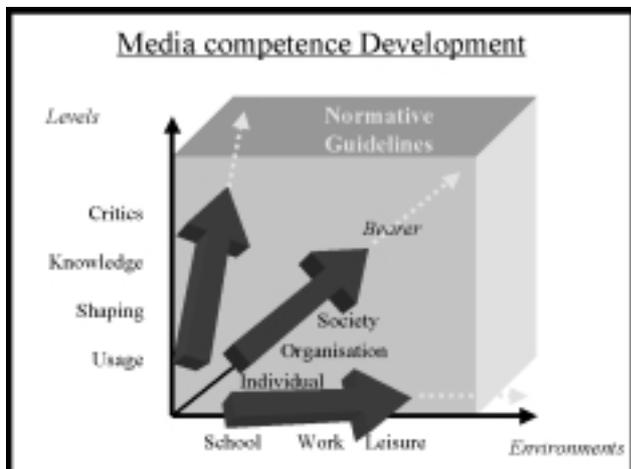


In the following the term media competence explicitly refers not only to an individual's ability but also to an institution, an organisation, or even to society. By introducing a third dimension of media competence, a more holistic perspective on the problems and challenges - which occur when promoting media competence on the individual level - might be gained. This suggestion of an abstract and analytical framework could broaden the strategies and tools which foster media competence and could help to place the term as a key concept in the information society.

Media competence can be seen as space in between three axes:

- **Range of media usage and environments:** be that in institutional learning settings such as schools, universities or vocational training or in informal learning environments for citizens and consumers. Measures to foster media competence should therefore include different institutional forms and bodies such as educational institutions, media companies, public libraries and so on.
- **Levels of media competence:** The complex concept of “media competence” is usually being differentiated in various sub-dimensions like media knowledge, media critics, media shaping/creation and media usage [5]. The number and categories vary from author to author. As a minimal distinction “*first order observations*” (instrumental competencies and skills) and “*second order observations*” (observing first level observations: media critics and ethics) can be separated. These abstract terms can not only be applied to the cognitive level of an individual but also to the level of communication in social systems (which is a precondition for the next dimension).
- **“Bearer” of media competence:** Despite the traditional assumption that an individual “has” or acquires media competence, it makes sense to talk about the media competence of social systems such as a schools or a companies (organisations) or even about the media competence of society with regard to its “ability” to set up adequate boundary conditions to promote media competence on all levels.

With regard to this model promoting media competence means working on the interfaces of personal, organisational and societal development processes. Media competence is not restricted to certain target groups, but affects all social groups. Strategies on fostering media competence therefore have to deal with a heterogeneous set of institutions, bodies, ministries, public and private initiatives. Media competence has to be created (not “conveyed”) on individual, organisational and societal level.



Graphically speaking the developmental processes should utilise the complete cube in the diagram shown beside. The promotion of media competence should not be restricted to an individual's skill, e.g. on how to use a computer in school (lower left corner). Even the critical use of media by a citizen (upper right corner) might not be sufficient from a holistic point of view. Quite often, only the front side of the cube is taken into account but not the deep structure of media competence.

Organisational changes are needed in order to take advantage of the full potential of media communication. Public awareness raising activities and discussions should elaborate on the objectives and impacts of media integration on societal level. Fostering and developing media competence requires normative guidelines on all three levels. These guidelines and values give reasons for the expansion of media competence.

The general cube-model on media competence can be applied to different target groups and institutions. Public libraries, for example, play an important role as media access points and as local centres for “information competence” with regard to both traditional and New media. Restructuring a public library as a media competence centre requires new roles and qualifications for the staff (individual level), inner organisational changes and additional support structures (organisational level) as well as a public discourse and political decisions about the future role of public libraries in the information society. Analogous to a media competent library, a school can be viewed as a learning organisation in the process of restructuring. Apart from teacher training and learning new abilities to read media messages (individual level), organisational changes are necessary: Defining a common vision for media usage in school and translating it into action as an accepted media- or IT-plan (which again includes data on resources, time schedules and finances as part of a school development plan) indicates a high level of media competence on the organisational level. Developing “regional media competence” with external partners could yield to regional learning landscapes. Here the “second order observation” means the implementation of evaluation schemes which observe and eventually alter running integration processes on this level. In the case of media competence in school education the societal level covers educational policy issues: Are the New media and media literacy integral parts of teacher education at university? Does educational policy strengthen the autonomy of schools regarding the implementation of ICT in learning processes? Do public-private-partnerships support the use of New media in education? Does a critical public discourse on the commercialisation and “technologization” of education take place? This process requires normative guidelines (“Leitbilder”) on all three levels. This very general three dimensional model can be applied to the projects which are conducted by the European Centre for Media Competence.

An institutionalised example: The European Centre for Media Competence (ecmc)

If media competence is to be promoted, the peculiarities, needs, and social context of the respective target groups must be taken into account, and the social boundary conditions must be created in a responsible way. The European Centre for Media Competence (ecmc), founded in 1997, an interfacial organisation set up in the form of a public-private partnership.

ecmc

- develops innovative projects
- professionally manages projects with in-house support departments (web design, programming, system administration, documentation and information, public relations)
- provides advice

in the field of media competence, in so far as this field occupies a position midway between the market-oriented interests of commercially-organised enterprises on the one and general social and democratic needs on the other hand. ecmc develops the work techniques to be found in each of these spheres and executes appropriate projects together with partner organisations from both sides. The Centre’s organisational form - that of a public-private partnership - is an internal reflection of these objectives which are pursued externally. Public-private partnership means construing the coexistence of private and public interests not as a clash between opposites but as an opportunity. The responsibilities of the first side can be merged with those of the other side in the process of social creation. The path towards the knowledge society requires a wide base of social participation.

The limited-liability company (GmbH) ecmc is supported in these efforts by public and private shareholders, among them Deutsche Telekom, European Institute for the Media, German Trade Union (DGB), State of North Rhine-Westphalia (NRW), Regulatory Authority of NRW (LfR), RTL Television, Siemens, Westdeutscher Rundfunk and others. Being a characteristic of overriding importance, the idea of public-private partnership is reflected in ecmc’s concrete projects, where it serves as a model.

Examples of Projects

Ideally projects conducted by ecmc should promote media competence in all three dimensions mentioned above. These projects usually refer to new media and include aspects of public-private-partnerships on different levels. The following examples of projects in which ecmc is involved in should illustrate the scope of promoting media competence mainly in the educational sphere.

- “*Unemployed Youths - New Perspectives in the Information Society*” was a pilot project launched in August 1998, and designed to enhance the prospects of youths and young adults on the labour market. The partner organizations collaborating here were ecmc, the Municipality of Oberhausen, and the European Commission. The aim of the pilot project was to make it possible for socially-disadvantaged unemployed youngsters to gain access to PCs and the Internet and to teach them how to use the items offered in a competent and critical fashion. In addition to project-oriented learning, the potential of the new technologies for vocational purposes was assessed in expert workshops, and potential employers’ qualification requirements were ascertained. The project as a whole was backed up by a public relations campaign that presented the problem in a way that clearly accentuates it, so as to generate a response in as many areas of society as possible (<http://www.ecmc.de/ja/>).
- *NETD@YS NRW* - as part of *Netd@ys Europe* - deal with the topic of “Learning and New Media”. During one project week, schools design and realise projects together with companies, associations and organisations in their neighbourhood. These projects range from the joint design of a homepage, multimedia workshops and the production of educational content to email projects, video-conferences etc. An independent jury awards prizes to the best of the projects which excel in originality, creativity, an emphasis on interactivity, or the exemplary nature of their procedures. Diaries of the projects can be found on the *NETD@YS NRW* homepage (<http://www.netdays.nrw.de>). Over the past four years hundreds of schools, partners and sponsors supported this state-wide initiative on opening the school by conducting projects with ICT. North Rhine-Westphalia therefore is the first Land of the Federal Republic where the idea of public-private partnership in the school sector could be realised on a more than local level. On behalf of the German "Schools to the Net"-initiative (SaN), ecmc is presently co-ordinating the *Netd@ys Germany* activities (<http://www.netdays.de>).
- ecmc has initiated the pilot project “*TeleMentoring – using telecommunications to provide support for disadvantaged groups based on personal relations with mentors*”. This assignment has been given by the North Rhine-Westphalian Ministry of Labour, Social Matters, Urban Development, Culture, and Sport and the project is sponsored financially by the European Social Fund. In the first phase of the project, young people who are unemployed or threatened with unemployment will be given an opportunity to establish contacts, through email-based dialogues, with mentors experienced in vocational matters. The telementoring relationships thus set up are primarily designed to provide these socially-disadvantaged groups with vocationally-oriented support, but psycho-social support will be important too. In this project telecommunication is used to create innovative mentoring relationships with new characteristics in communicative actions (<http://www.telementoring.de>).
- The “*European Experts’ Network for Educational Technology (EENet)*” is an independent association consisting of institutions and organisations from 13 European countries. All member organisations agreed to a series of actions and a framework for working together to generate, gather, distil and disseminate strategic information in the field of Information and Communications Technologies (ICT) in education. EENet's mission is to create a better understanding of ICT policies in European education and the processes linked to the implementation of them. A core tool for this work has been an “Observatory on ICT in European School education, co-developed by ecmc. As German member in EENet since 1997, ecmc took over the secretariat for the network in 2001 (<http://www.eenet.org>).

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BUILDING COMMUNITIES: ONLINE EDUCATION AND SOCIAL CAPITAL

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Introduction

Recent discussions of the social impact of the Internet have been polarised into two camps. On the one hand, pessimists consider that the application of communications and information technologies to an ever widening range of social, cultural and economic activities (e-commerce, e-learning, *etc*) is providing yet another dimension for social exclusion. To lack access, for whatever reason, is to be excluded from the burgeoning knowledge society. Technological utopians, on the other hand, consider that the development of C&IT provides the basis for new forms of social inclusion, enabling people to participate in society regardless of temporal, spatial and other physical constraints. From this perspective, the extension of the Internet provides scope for a rise in social capital, “connections among individuals - social networks and the norms of reciprocity and trustworthiness that arise from them” (Putnam, 2000, p.19). Given the extent of investment in C&IT and the salience of social inclusion in the social policies of Western nations, the relative validity of the two views is of considerable significance. The application of C&IT to open and distance education provides a test bed for evaluating their relative salience.

Social Capital

Social capital is an umbrella term that appears to have been independently invented a number of times during the twentieth century, most notably by Putnam (1993; 2000), Bourdieu (1985) and Coleman (1988). There are close links between the term and a number of other concepts used in the social and policy sciences to describe the state of social organisation or disorganisation, *e.g.* social cohesion, social inclusion and social integration.

In what has become recognised as the most well-developed exposition of social capital, Putnam focuses on those forms of social capital relating to civic engagement: “people’s connection with the life of their community” (1995b: 665), concentrating on such relationships as membership in neighbourhood associations, choral societies or sport clubs, but also including less formal networks.

“Social capital is closely related to what some have called civic virtue. The difference is that social capital calls attention to the fact that civic virtue is most powerful when embedded in a dense network of reciprocal social relations” (Putnam, 2000, p.19).

The consequences of low social capital for health and welfare are legion. At an individual level, social connectedness has been shown to be an important determinant of physical and psychological well-being (House *et al.*, 1988; Seeman, 1996). Wilkinson (1996: 5) notes that

“People with more social contacts and more involvement in local activities seem to have better health, even after controlling for a number of other possibly confounding factors.”

At a community level, low social capital has been implicated in a variety of social problems, including high rates of crime (Sampson & Groves 1989), child abuse (Garbarino & Sherman, 1980), developmental difficulties among adolescents (Furstenberg & Hurst, 1995) and poverty (Thomas *et al.*, 1998). The relationship between social disorganization in local communities and higher rates of deviant and aberrant behaviour was one of the major findings of researchers belonging to the Chicago tradition of human ecology. Kornhauser (1978, p. 63) noted the concentration of deviant behaviour in socially disorganised districts: communities “that cannot supply a structure through which common values can be realised and common problems solved.” More recently, the connection between high social capital and positive behavioural and social outcomes has become part of the *communitarian* agenda developed by Etzioni (1998) and enthusiastically taken up by “third way” politicians on both sides of the Atlantic.

Social capital is concerned with connections between individuals and wider groups. In order to analyse the extent of social capital or to examine its effects, it is important to consider the social context involved. Individuals may well be integrated into their immediate community yet isolated from the wider society. People in marginalised and stigmatised communities may feel discriminated against and excluded from the wider society and may, in turn, disengage (Foundations, 1999). Castells (1998) warns of the danger of a "new tribalism" in network society. Putnam (2000, p.21 - 22) points out that

"Networks and the associated norms of reciprocity are generally good for those inside the network, but the external effects of social capital are by no means always positive...It is important to ask how the positive consequences - mutual support, cooperation, trust, institutional efficiency - can be maximized and the negative manifestations - sectarianism, ethnocentrism, corruption - minimized."

Strong social capital within a group can lead to the exclusion of outsiders. In addition, dense, closely-knit social groups can create pressures for conformity among members that restrict freedom and may make it difficult for them to gain access to resources and information that are available elsewhere (Portes & Landholt, 1995). Inner-city gangs can be seen as an attempt by members of an excluded group to develop a high degree of internal social capital through an emphasis on exclusivity and internal bonding. To avoid fragmentation, bridges between groups are an essential element in social cohesion, knitting groups together. This is a task which online or networked learning seems well designed to undertake, especially when it is concerned with collaboration across boundaries.

Social Capital and Computer Networks

Wellman and Gulia (1999) point out that the relationship between the use of electronic networks and social interaction is dominated by anecdotes, assumptions and prejudices rather than empirical research.

Critics of the social implications of C&IT believe that computer-mediated communication (CMC) may replace face-to-face contact between people with less-satisfactory "virtual" interaction, which will lead to further isolation and the atomisation of society. Stoll (1995:58) claims that "computer networks isolate us from one another, rather than bringing us together", pointing to the danger that "by logging on the networks we lose the ability to enter into spontaneous interactions with real people." According to McClelland (1994:10):

"Rather than providing a replacement for the crumbling public realm, virtual communities are actually contributing to its decline. They're another thing keeping people indoors and off the streets. Just as TV produces couch potatoes, so on on-line culture creates mouse potatoes, people who hide from real life and spend their whole life goofing off in cyberspace."

Despite the strength of the views expressed by the critics, their concern that the use of CMC will lead to a decline in face-to-face relationships has found little support in empirical studies. Instead, a number of researchers (e.g. Beamish, 1995; Hamman, 1998) report that the use of C&IT serves as a complement to face-to-face interaction, rather than a substitute. Other writers suggest that relationships formed in cyberspace may, in any case, be just as emotionally-charged as ones based on physical presence and may have similarly significant implications for identity and community.

The on-line community is often referred to as a "virtual community", a term popularised by Howard Rheingold in his book of the same name. Rheingold (1993, p.5) offers this definition:

"Virtual communities are social aggregations that emerge from the Net when enough people carry on ... public discussion long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace."

Describing the experience of participating in one of the earliest on-line communities, the WELL, Rheingold (1993:3) notes:

"People in virtual communities...exchange pleasantries and argue, engage in intellectual discourse, conduct commerce, exchange knowledge, share emotional support, make plans, brainstorm, gossip, feud, fall in love, find friend and lose them, play games, flirt, create a

little high art and a lot of idle talk. People in virtual communities do just about everything people do in real life, but we leave our bodies behind. You can't kiss anybody and nobody can punch you on the nose, but a lot can happen within those boundaries."

According to Wellman (1997, p.179) "When a computer network connects people, it is a social network". Hawthornthwaite *et al* (1998, p. 213) note that "Virtual communities extend the possibilities for community; just as CMC extends possibilities for interaction." Blanchard and Horan (1998) comment that virtual communities provide the basis for new forms of social capital.

An on-line community, like one grounded off-line, is held together by the feelings of togetherness and connectedness that confer a sense of belonging (Foster, 1997). Such feelings do not 'just happen'. In a speech delivered as part of the *BBC Online Community Day* (17 June 1999), Rheingold (1999) points out:

"In order to succeed, a virtual community has to have an affinity – the answer to the question 'what would draw these people together?'"

In order to form a community, "virtual" or "real", participants need to share a common purpose: it is in this connection that the use of the Internet for online education may be especially relevant.

Kollock (1998), while noting that "There is no algorithm for community", suggests a number of guidelines for the development of on-line communities that are derived from work on inter-personal co-operation and social dilemmas. Among the points mentioned are the importance of individuals sharing information about each other, ensuring continuity of interaction, allowing sufficient time for people to express themselves, sharing interests and having self-administered rules and sanctions. All of these are characteristics shared by a learning community.

Online Learning Communities and Social Capital

In an attempt to explore the potential of the Internet for the development of learning communities, an online module, "*Community Portraits*", was trialled in 1999. The module was designed as part of Project SCHEMA (Social Cohesion through Higher Education in Marginal Areas), funded by the EC Educational Multimedia Taskforce. Community Portraits was initially directed at the continuing professional development needs of health and welfare workers in geographically remote areas of Scotland, Finland and Germany. A collaborative approach to learning was adopted, based on the view that successful health and welfare practice involves both knowledge of the community context and a willingness to collaborate across professional specialisms.

Participants in the trial run consisted of nine health and welfare workers, four in Finland, three in Germany and two in Scotland. Three groups were established, each containing a mix of nationalities and professions. During the course of spring 1999 (February-June) the participants met online, developed work-plans, produced and exchanged community portraits and discussed the process of collaboration. The project took longer than anticipated, mainly as the result of minor technical difficulties. Many of these related to what had been intended to be a minor aspect of the learning environment – a chat facility. The course tutor noted

"Reflecting on the difficulties encountered in fostering collaborative working relationships in Community Portraits, insight from comparison with face-to-face experience may be useful. Participants in Community Portraits have made much of their problems with Chat buttons and I have noted ... the link between this and the importance of trivia in the development of effective collaborative relationships. To be more accurate, if we are to know how best to promote effective collaborative relationships, we may need to switch attention from issues of principle, such as shared purpose and task definition, to the more humble contextual aspects of good social relationships: irrelevant exchanges, humour, eating and drinking together, etc. Some of these are not so easy to provide online and some (such as humour and irrelevance) may seem to usurp task time online. Legitimizing such interchanges may be an important role for the tutor"

Although the common experience of technical problems led to delays in the planned timetable, it had the beneficial effect of uniting participants in a desire to overcome adversity. Kollock (1998) suggests that some risk may be useful in the development of a learning community:

“without risk online communities will be dull and will not provide the possibility for the development of high levels of trust”

Within a learning community, risks and crises can arise from built-in tasks, from internal disagreements, from such external factors as assessment and from breakdowns in communication.

The core task of *Community Portraits* required participants to make comparisons within a collaborative process. The main comparisons were of communities, but important subsidiary comparisons relating to self and others were also expected. Observation of the early online exchanges suggested that a disproportionate effort was put into identifying similarities rather than differences. It appeared that similarity was being pursued in order to avoid potential disagreement as a way of easing harmonious communication. To some extent this probably reflects cultural patterns of politeness, but it has the effect of denying differences which may be significant. Recognition of difference is an important part of the learning process.

In this instance it was easy for the course tutor to suggest that attention to differences rather than similarities between communities might yield more interesting discussion. More sensitive, in a general sense, is the need for recognition of interpersonal differences and for participants in collaboration to respond to these differences. Responding to one another as similar beings is to encourage relationships that are based only on the features of the other that each person recognises in herself: in effect a denial of individual identity. Rigid adherence to external rules of polite social engagement has a similar impact. Where collaborative tasks are involved, an emphasis on politeness and a denial of difference runs the risk of missing the range of contributions offered by exploration of differences. The importance of differences lies not simply in the fact of their existence, but in the opportunities they create for personal authenticity in interpersonal relationships, maximising individual initiative, multiplying ideas and offering a richer platform for further development of the interpersonal/collaborative relationship.

Despite technical teething problems and the long time it took for the online groups to get down to productive engagement, the trial run of *Community Portraits* suggested that the approach was worth pursuing (Timms 1999a & b). The experience of participating in online collaboration did lead to the development of a learning community among professional workers across disciplines and countries and to an increased awareness of the context in which practice took place.

The Next Stage

It was always part of the approach used by SCHEMA that forms of learning focussing on online collaboration could provide the basis for developing a sense of community among non-professionals as well as professional workers. Online collaboration has the potential for building community among all participants. In spring 2001 a version of *Community Portraits* is being run as a means of connecting groups of lone parents and senior citizens living in peripheral housing estates in Stockholm and Glasgow. Both areas have been subjected to adverse coverage in the media and analysis of a survey administered in one of the communities involved suggests a relatively low level of social capital (Ferlander & Timms 2001).

At the time of writing the groups have been online for less than a month. They continue to exhibit a high degree of optimism and enthusiasm about the potential impact of online collaboration. Coming together to take part in the project has already led to the development of links between previously disparate segments of the population. It is anticipated that the development of learning communities, based on online collaboration in the production of community portraits, will provide a way of bridging gaps between groups and enhancing both networks and trust. Ongoing research is addressing such questions as whether participation online leads to more participation in the community or further fragmentation and isolation? More generally, what role can online learning communities play in helping to bridge barriers between local communities and the rest of society? To the extent that the answers to these questions turn out to be positive, it will appear that online learning may be able to play a vital role in the (re-)creation of social capital.

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MOBILE TEACHING AND STUDYING IN THE UNIVERSITY CONTEXT

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The Centre for ICT promoting mLearning

Finnish universities are on the edge of being transformed into a symbiosis of a traditional university and a virtual university. The visions and plans of higher education that have been announced in national strategies are becoming reality. The University of Helsinki established the Educational Centre for ICT (information and communication technologies) in the beginning of 2000 to support university teachers in their attempts to benefit from technology in their teaching and to develop their pedagogy to use information and communication technologies for didactic purposes.

The centre has started a venture in which mobile teaching and studying is being experimented and investigated. Two projects have been set up so far: the eBook project and the UniWap project.

The aim of the eBook project is to experiment with mobile publishing in the university context and to develop pedagogical applications to be used in higher education, especially in the virtual university. University teaching is based on research and the project aims to facilitate the publishing of results to become learning material for students. Another aspect of the project is to see students as producers. In other words, producing learning material is regarded as more interactive than it is today. The eBook project is a joint venture between Helsinki University, Helsinki University Press and, during autumn 2000, VTT Information Technology. The UniWap project [<http://ok.helsinki.fi/sivut/uniwap.html>], in turn, deals with the WAP technology to be tested, piloted and completed in order to facilitate teaching and learning in the university. The project is a joint venture of the Helsinki University and *ICL Invia*. The mCastor technology enables the user, who may have several terminals such as WAP, PC or Communicator, to use the same information service or system adapted to the actual user environment.

In the background of these projects is the research into the use of mobile technology in schools and in teacher education that has taken place at the University of Helsinki. The LIVE project running from 1997 to 2000, was an endeavour in which Nokia Communicators were used to establish flexible mobile teaching and studying environment for pupils, student teachers and for the university teachers in the context of a school network. (Nummi et al. 1998)

As a researcher, I am interested in conceptual matters and in building up a theoretical framework concerning these two projects and mobile teaching and studying. In this presentation, I will not concentrate on the practical question of the projects, both of them are in their infancy. Instead, I will discuss the mLearning concept which, presumably, is the concept that should be used in this context.

The mLearning concept

The theoretical framework is based on the educational theory. One of the first things to do has been conceptual analysis. The term 'mLearning' has lately emerged to be associated with the use of mobile technology in education. It seems, however, that it is being used for commercial purposes rather than as an educational concept. I wonder if the term is a commercial trick of market technology and educational services or if it is an emerging concept that educationalists should take seriously.

'Just what is mobile elearning (mLearning)?', asks Clark Quinn (2000) in 'Line Zine'. His answer is: 'It's elearning through mobile computational devices: Palms, Windows CE machines, even your digital cell phone.'. Accordingly, mLearning is defined with the terms of information and communication technologies. When we try to understand mLearning from the perspective of educational theory, a technology-based definition is obviously not sufficient. However, it is interesting to try to benefit from the technological perspective. What kind of words can we associate with mobile technology? First, 'portable', which means that we can carry those devices that we call mobile. Second, wireless, i.e. there are no wires attached in the equipment. These two aspects: 1) a device is so light that you carry it, and 2) there are not wires in the device, are not very interesting from an educational point of view. Instead, we could try to find out something

educationally interesting in the third aspect: 3) we are moving when using technology. In other words, the actual ‘mobility’.

When we further consider the mobility aspect, we may ask: ‘Who is moving and why is moving’. From ‘why’ we later come to the question of ‘where’. Let us think about ‘why’, first. There are two explanations. First, the reason for moving is irrelevant, regarding learning and teaching. A person just happens to be moving while conducting educational activities. It deals with **convenience**: rational time management and other such things. In this sense, mobility does seem like interesting from the pedagogical point of view. However, it gains some pedagogical relevance when we add to the explanation that a person, a student or a teacher, is moving because it is possible for him or her to be moving and simultaneously conduct educational activities, like studying and teaching. I shall return to this aspect later in this article. Second, we can assume that a person is on the move in some particular place or places which is/are relevant regarding the subject that is being taught or that is being the studied We may call this the perspective of **expediency**. We can also argue that the first of these two explanations is the perspective of the receiver while the second is that of the producer.

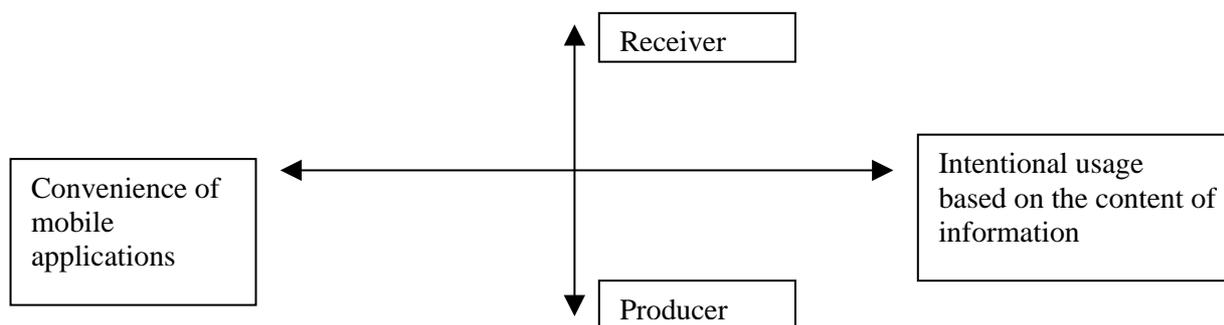


Figure 1. The perspectives of convenience, expediency, receiver and producer. (Sariola et al. 2001)

We can also ask, who is moving? There are several possibilities. First, naturally, a student and a teacher come to our mind. Further, it may be an outside expert or, interestingly, it may also be someone or something that is the object of studying and teaching (for example, some animal in the studies of zoology). One or two of these possible parties may be moving or, perhaps, they all are on the move. At least for the student and the teacher, both the convenience perspective and the expediency perspective are true.

Finally, we can pose the question: ‘where is the moving taking place?’. Regarding to the convenience perspective, ‘where’ is not important. However, we can consider this perspective from the point of view of higher education concerning the relationship between the university and the surrounding society. The walls of the university become permeable. Work – leisure, university – home (or, regarding mobility, on the way to work/to home) and the public – private, blend. We may call this relationship a convenience relationship between the university and its surroundings, where people carry out their activities. When regarded from the expediency perspective, the relationship between the university and the entire society can be described through such expressions as ‘the university as a part of the society’ and ‘the surrounding society as a part of the university’. Kynäslahti (1998) has characterised this kind of integrated relationship with the change from the past tense to the present. In other words, an educational organisation has a real time relation to society.

We see that the theoretical elaboration of ‘mobility’ is one of the key issues when building up the theoretical framework. In this process, the analysis of mLearning seems to be an essential task. This article is an attempt to do so and to evoke discussion about the characteristics of the term that will possibly be a common educational concept in the future.

Briefly about the projects

At the first stage of the eBook project, autumn 2000, a pilot e-book (Kynäslahti 2000) was published. This stage focused on technical questions: how the material that a university researcher produces should be technically processed to be suitably published as a Rocket eBook (REB 1100). There were also interests to investigate the relationships between traditional paper publishing, network based publishing and the e-book. From a pedagogical point of view, the first stage concentrated on conceptual elaboration, as the previous considerations of the mLearning concept indicated, and on the forecasting of pedagogical

applications suitable for higher education. The second stage, starting in the spring term 2001, focuses on pedagogical questions. We are predicting pedagogical opportunities that the electronic book is able to provide for higher education and its possible role in the development of the virtual university.

At the first stage of the UniWap project, in the academic year 2000-2001, a group of university teachers was selected as a pilot mobile group to complete their in-service training. The course focuses on the educational use of ICT and it is provided by the Educational Centre for ICT. The students (i.e. university teachers) conduct their studies in teams of 2 to 4 persons and the aim is to design and to realise a subtask which is related to their own work as a teacher. Their efforts are supported by a mentor. The first group of 14 persons was established in February 2001. Nine students were provided with Nokia Communicators 9110i and the rest with Nokia 6210 WAP mobile phones. The training includes face-to-face meetings, using the WebCT environment and mobile studying. In addition, the pilot group has its own web pages, which are mostly used for informational purposes. These different elements are associated with particular forms of network-based studying, each of them in their own way supporting the subtasks that the students are working with. According to the mentor, the benefits of mobility at this first stage have appeared as a special possibility to support the students. Between the face-to-face meetings, the mentor has given instructions through technology according to the actual situation of the students' subtasks. For students, the mobile technology has enabled immediate writing of short messages in order to process their learning experiences to be added to their study portfolio. These activities have been possible, even if both the mentor and the students often move between different places, including different campuses, during their work days. (Sariola et al. 2001)

Conclusion

The University of Helsinki began to experiment with the educational use of mobile technology, as early as 1997 in the form of school network projects (Nummi et al., 1998). Today, these first steps appear as a reaction to weak signals of something that in the present educational world could be called mLearning. In this article I discussed mLearning as an educational concept. Further, I have briefly reported two current projects, the eBook and the UniWap, in which mobile technology is utilized and experimented with in relation to the needs of higher education. The projects are in their first, promising stage. The practise, as well as the theoretical elaboration, provide a challenging field both for technologists and educationalists to develop mLearning.

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IQ-FORM –THEORETICAL UNDERSTANDINGS OF VIRTUAL LEARNING

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Introduction

This abstract aims to present the IQ-FORM project, one of the major research projects of the Finnish Virtual University (<http://www.virtuaaliyliopisto.fi/english/index.html>). After the short presentation of the project the author concentrates to the theoretical understandings of mediated learning, one of the main theories behind the IQ-FORM project. IQ-FORM project is lead by *Professor Hannele Niemi*, Dean of the Faculty of Education at the University of Helsinki. IQ-FORM is realised in close co-operation with the Department of Computer Science at University of Helsinki. Other partners are universities of Tampere, Oulu and Joensuu.

1. IQ-FORM supportive learning environment for the Virtual University of Finland

IQ-FORM project aims at developing a supportive learning environment for the Virtual University of Finland, a consortium of all the Finnish universities. The main tasks of the project are:

- to identify different learners' needs in virtual learning environments
- to create a flexible tool for data collection from large numbers of students
- to use a Bayesian technique to model data of different students' learning profiles and needs in open learning contexts
- to use the new data collection technique developing learning materials for virtual learning environments
- to develop new tutoring methods for virtual learning

2. Theoretical framework of the project

The theoretical framework of IQ-Form is based on theories of **mediated learning** and distributed cognition as well as Gardner's theory of multiple intelligences and Pintrich & Ruohotie's motivational theory. Professor *Hannele Niemi* defines the two main concepts of the project, the concept of learning and the teaching and tutoring concept.

The learning concept

- individual differences (Snow, Corno and Jackson 1996)
- collaborative knowledge creation
- interaction with symbol systems (distributed cognition)
- active and intentional processes

The teaching and tutoring concept

- supporting learners to self-regulation
- providing strategic learning skills (cognitive, affective and conative)
- providing resource management skills
- creating collaborative learning space
- serving as moderators in mediated learning

3. How to create a supportive learning environment?

Tools for learners

The project creates tools through which students can learn about themselves as learners and acquire skills to become more effective learners in virtual courses. The set of learning tools in the IQ-FORM project consist of the intelligent questionnaire which profiles the students as learners. The questionnaires in the IQ –FORM databank work as an interactive tutoring method. The students may select different combinations of tests for self-analysis, which help them to become more conscious of their learning styles and motivational strategies and changes in these qualities during the course. Their profiles also tutor them to find help and support from their teachers or peers and to encourage them to use new kind of learning material or routes to find more effective learning strategies.

The first virtual courses, which will use the IQ –FORM as the supportive tool will be starting during 2001.

IQ-FORM - intelligent questionnaire

The main tool to help the learner is called IQ-Form (intelligent questionnaire), an interactive databank. IQ-Form gives information about the qualities of students as learners e.g. learning profiles and motivational structures as well as social navigation during their virtual studies.

Databank

The questionnaires work as a data bank from which the students may select different combinations of tests in order to become more conscious of their learning styles and motivational strategies and changes in these qualities when studying. Their profiles also tutor them to find help and support from their teachers or peers and encourage them to use new kind of learning material or routes to find more effective learning strategies.

4. Who needs IQ-Form?

The main user of IQ-Form is the learner him/herself - a tutor of one's own learning. IQ-Form helps the course tutor to supervise and support students to become more effective learners. IQ-Form can also be used by the course designers who need to understand different learning routes and difficulties.

5. Theoretical understanding of virtual learning –mediated learning virtual learning environments

This proposal explores what is mediation when developing virtual learning environments, where human mediator is not available but a humanistic component is highly needed in the learning process. The presentation gives one example of the methods of mediating students in their learning process. This method acts as a mediator of learning through providing support and tools for better self-awareness when studying in technology based environments.

Studying in a virtual environment sets new kind of demands on learning skills. Students need different abilities to learn in a virtual environment and should be given equal opportunities to success.

The virtual environment is deprived in one essential sense: there is no physical presence of a teacher or peer students. When looking at the problematic of how to support studying in a virtual learning environment I came across the theory of mediated learning experience (MLE) of Reuven Feuerstein and its basis in the theory of structural cognitive modifiability (SCM).

When researching mediated learning in the IQ-FORM project it has two purposes: to study how does the theory of MLE fits the new technology based learning environment and to study, what are the student experiences of mediated learning when using mediated tools.

Mediated Learning

The theoretical framework of this presentation comes from theory of mediated learning experience of Reuven Feuerstein, which provides the meta-level theoretical background for the research. The mediated

learning experience is studied when using an interactive tutoring method (IQ –FORM databank) in virtual learning environments.

The theory mediated learning experience is a basis when describing the phenomena of supported learning in a virtual learning environment. IQ –FORM is the tool, which can be regarded as an instrument aiming at mediated learning through mediated learning experience.

A virtual learning environment can be seen as an environment deprived in a very basic sense - an absence of a human mediator. Nevertheless the idea of our project is that the

IQ-form learning support system can act as a mediator in a virtual learning environment. To ensure the quality of learning in virtual learning environments support and tutoring systems are needed. One innovative effort to find new tools for this support is the IQ-FORM project.

Interactive tutoring as a mediator in virtual university

Reuven Feuerstein set criterions for mediated learning such as intentionality, reciprocity, transcendence and mediation of meaning. In the theoretical study the author aims to reflect the following issues concerning the criterions of Feuerstein, when regarding studies in a virtual learning environment:

- *Intentionality*
How does the learner use her/his cognitive abilities in the virtual learning environment?
- *Reciprocity*
Can the student to feel that she/he is on the equal with the mediator as a fellow explorer in the learning process (here mediator can be seen as the teacher and peer students) in the virtual learning environment?
- *Transcendence*
Does the mediation assist the student when "bridging" the experience and lessons learned in the current situation to new situations in the virtual learning environment?
- *Mediation of Meaning*
Does mediation give tools to the student understand the meaning of her/his learning accomplishment in a deeper sense: why this had to be learned and how the learned can be generalised to new and even more difficult learning situations in the virtual learning environment.

The abovementioned criterions are according to Reuven Feuerstein the necessary conditions of MLE. The possible presence of the above mentioned mediation criterions in a virtual learning environment are going to be carefully studied. However also the rest of the MLE criterions are studied. IQ-FORM is going to be in test use at courses at Finnish Virtual University. Fall 2001 students are going to be interviewed after that they have used the IQ-FORM as a helping tool in their virtual studies.

6. Scientific and Educational Relevance

By studying a method for mediation such as IQ-FORM and its possibilities to a mediated learning experience in a virtual learning environment, more knowledge about virtual learning processes can be reached. This study can bring knowledge about the conditions of prevailing the partly deprived learning situation in a technology based learning environment. This study gives ideas about, what might be the impact of a learning support systems consisting of self-analysis of learning qualities with an interactive tool.

Further, this presentation can enhance the discussion and further research of the possibility of mediation in a virtual environment where the mediator even if not being human, is created by the human being.

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STRATEGIES FOR DEVELOPING E-EDUCATION FRAMEWORKS: LESSONS LEARNED FROM A SUCCESSFUL EUROPEAN CO-OPERATION PROJECT

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Abstract

This paper gives an overview of representative strategic issues that drive the development of e-Education frameworks. The authors analyse different factors, from the influence of governmental policy, to institutional attitudes and educational settings. The conclusions presented in the paper are mainly drawn from the experience gained in local environments and ideas developed within the European Union Socrates Project "An ODL Framework for Transnational Business Information Systems".

1. Introduction

The project "An ODL Framework for Transnational Business Information Systems" started in September 1998. It is a three years project where 10 universities from nine countries from European Union participate. The project is sponsored by the European Union under Socrates/Minerva programme (Contract: 56605-CP-1-98-1-SE-ODL-ODL, 56605-CP-2-99-1-SE-ODL-ODL and 56605-CP-3-2000-1-SE-MINERVA-ODL).

The main objective of the project is to consolidate and integrate the present knowledge of Open Distance Learning (ODL) systems development, particularly in the area of Business Information Systems (BIS), develop framework for ODL in Business Information Systems Education using multimedia systems, new technology and applications, and establish communication channels for disseminating the current knowledge, and the knowledge that will be produced in the future.

2. Background

A major problem in the design of distance education is that sometimes attempts are made to apply the traditional pedagogical tools into a technologically enhanced environment in order to deliver distance education. Universities have to acknowledge that their distance education activities must be managed in ways that are foreign to most face-to-face teaching responsibilities. The autonomy of faculties, departments and teachers in their disciplines is a cherished university value. It is fortified by the ever-increasing specialisation of knowledge as well as by the concept of academic freedom. But distance education responsibilities cannot be thought of realistically other than in operational terms. Different forms of knowledge and expertise have to be combined through a series of co-operative efforts. This calls for long-term planning, concerted action across faculties and departments, and efficiency in the development of programs of study, the regular despatch to students of study materials, and the equally regular marking of assignments, tests and examinations. The challenge is to find ways of combining managerial, monetary and academic principles.

Open and distance education programs advocate an inter-disciplinary, problem-solving or theme-oriented approaches to curriculum development, that fits well with the concepts of course development by teams. Universities, on the other hand value autonomous faculty work in teaching, scholarship and research. Promotion decisions are rarely, if ever based on direct observation of the teaching performance in the classroom. As academic freedom is one of the dominant norms of university culture, its major emphasis is on independent work - teaching alone, planning curriculum and courses alone and often researching alone. Globalisation, new technologies and market pressure are going to change the way in which universities will approach research and teaching in the not too distant future.

3. Development of a Structured Framework

The development of the framework is a result of different experiences from the participating institutes, existing distance learning courses, available literature and discussion with other experts. There are six areas identified to a framework for distance learning. These are: Policy issues, Managerial issues, Ethics, Culture, Social Aspects and Language, Course Development and Maintenance, Design and Delivery Issues and, Technological Issues.

3.1 Policy Issues

Depending on the organisational context within which the distance education programmes are developed, there are different factors influencing the design of the framework. Single mode institutions will use different pedagogic strategies and tactics compared to dual or mixed mode institutions. This will lead to differences in policy, resources, and delivery mechanisms. There are both internal and external factors that influence the pedagogical setting. Typical internal factors are the attitudes and environments within which courses are developed and delivered. Examples of external factors are the influence of culture and regulations. The influence of national governments is perhaps the single most important factor in shaping the distance education policies of institutes.

3.1.1 National Policy

Government plays a vital role by promoting information infrastructure and by regulating education policies. Especially in the past 10 to 15 years, there has been an almost universal trend towards greater government emphasis on accountability by educational institutions. This emphasis on accountability frequently comes from a felt need to use increasingly scarce resources more effectively.

Governments demand that institutions demonstrate the appropriateness and quality of what they do. They require the development and use of indicators and measures of institutional performance and attempt to ensure that institutions respond to the results of such measures. Similar principles are applied to both distance and conventional education, though some measures may be less appropriate for distance teaching.

Different policy considerations come into play in dealing with competing educational interests within a country or within an institution. National policies focus on resource management, particularly setting up procedures for rationalising the use of technologies as a distance education resource. A perennial concern focuses on quality of programs and is manifested in policies regarding regulation, monitoring and accrediting of distance education delivery systems.

Within distance teaching institutions there is a similar range of policy issues, including questions of balancing the resources allocated for distance education against those of conventional provision, and the different roles of teaching faculty. One of the most sensitive policy issues of the present day concerns the role of distance teaching institutions in teaching in foreign countries, and the response of national educational authorities to this encroachment.

3.1.2 Institutional Policy

In distance education systems, institutional policy provides the basis for almost all activities associated with providing education and training to students. These policies are normally framed within national or regional policies and an institutional mandate or mission. But the policies that govern an institution's relationships with its main components - faculty and students for example, are usually established by an institution itself, as in conventional education. Such policies must recognise that the nature of distance education, with the physical gap between an institution and its students often necessitates a view of teaching and learning and of supporting activities that is very different from that adopted by conventional institutions.

A key to ensuring that mandates or missions are carried out and that institutional policies are implemented is development of a strategic plan. This plan becomes one of the primary instruments of institutional policy and provides the framework for allocating and managing resources and accommodating institutional change and development.

3.2 Managerial issues

Success in distance education requires leadership that can release an institution's creativity and entrepreneurialism, creating a working environment in which individuals and groups can respond to emerging opportunities and changing environments. It also requires building and sustaining organisational structures that will support appropriate responses to unexpected opportunities.

Strategic planning is only one tool in the effective management of an institution or program. Moreover, the need to plan strategically often conflicts with the need to remain flexible enough to respond to changing or unforeseen circumstances. This conflict may particularly affect distance teaching institutions, since governments often expect them to respond to circumstances that conventional institutions might be too slow to deal with.

The institutional or program budget that comes out of this process must be designed so that, like the strategic plan, it provides for change and accommodates unforeseen situations. There are two important differences between the budgets of distance education institutions and those of conventional institutions: The balance of allocation between, for example, teaching and other activities-such as development, materials production, and student support-is strikingly different. Distance teaching institutions normally have less need for capital funding in the form of buildings and equipment, and a much greater need for funds to develop and deliver course materials. The major funder of a distance teaching institution, normally the responsible government, must recognise that the institution's needs are often quite different from those of conventional institutions. Failure to recognise this difference has often been a source of difficulty for distance teaching institutions.

3.3 Ethics, Culture, Social Aspects and Language

Attempts to deliver courses and programs across national boundaries have assumed that materials and delivery methods can be transferred from one place to another. But experience has shown that this is not necessarily so, even in subjects often assumed to be culturally neutral, such as technology and mathematics. Thus distance educators have been faced with a need to adapt materials for overseas use or to develop materials specific to receiving countries.

With the growing potential availability and use of Internet technologies, the development of distance education is becoming an increasingly international affair. Distance education institutions have been among the leaders in developing and implementing schemes for institutional collaboration, often across national borders and the trend toward such collaboration seems likely to accelerate. Internationalisation raises some complicated issues, and distance educators and policy makers have had to review and modify their practices. In doing so, they need to know what problems other institutions and agencies have faced in confronting these issues.

Overlying these is the issue of cultural imperialism - the risk that materials originating elsewhere, particularly when they go from developed to developing countries, will be seen as an attempt to impose a stronger, alien culture. This is not just an international issue, it also arises in such areas as aboriginal education.

3.4 Course Development and Maintenance

A distance education system must manage resources efficiently. That means scheduling the use of instructors, students, and technologies to ensure that all are fully employed at all times but not overloaded. This scheduling is carried out through a course development plan (as part of an operational plan), which lists planning objectives, time frames, and actions, showing who will do what and by when.

Effective selection, training, and monitoring of design and instructional staff may be the most important factor in the success of distance education programs. Recruitment should focus on matching designers and instructors to the needs of the program and its students. Orientation should provide experiences that inform all staff about the distance learner and foster commitment to the process of distance teaching. Instructors with no distance teaching experience will need instruction in the medium or media being used, and assistance in learning how to develop and sustain a dialogue with students at a distance.

The management of staff working in design and delivery teams can be challenging, since many educators are unfamiliar with working under these conditions. Course teams must be set up and time and output schedules planned to ensure that promised courses come on-stream in time. The course team's weekly work of writing study guides, preparing video and audio scripts, making tapes, and planning assignments, projects, and teleconferences must be managed. And important staffing issues arise for an institution using part-time staff, relating to what proportion of part-time staff it should use, and how it should supervise their work and control its quality.

Budgeting involves making certain that adequate funds are available to meet program goals. Often a first step in preparing budgets is to determine the break-even point based on prospective enrolments and on projected expenses, including salaries for instructors and support staff, compensation for site facilitators, mailing costs, telecommunications charges, and, for technologically mediated courses, equipment purchases and maintenance. Most of the important distance education institutions are publicly funded, but there are many that are run as private businesses. The role of profit in the education system is an issue for policymakers.

Management must decide (or at least create a system in which employees decide) what courses to produce, guided by the mission statement and by needs, usually determined by market research or public policy. Course design Here, adequate resources usually mean a full range of recorded and interactive technologies and such specialists as instructional designers, media producers, content specialists, instructors, and learner counsellor.

3.5 Design and Delivery Issues

The issues of ownership and compatibility are central to the successful diffusion of distance education, and viewed as key issues in the adoption of distance education methods. Academy must respond to the needs of the students it serves. As the needs of students change so do the roles of faculty. The issue of ownership is crucial in the development of distance education, for we should never allow technology to "drive" the content. Likewise, the academy has a responsibility to shift from a faculty-centred to a student-centred educational system. The studies of effective distance teaching find those faculties who make this shift are not only more successful distance teachers, but also more successful classroom teachers.

Every course is planned to relate to every other course, every piece of every course is designed to fit with every other piece, and every technology is used in harmony with all the others. The topics an instructor discusses with students fit with the illustrations in the study guide. The learner support personnel have access to specialists in the organisation to deal with the issues arising at each step of a course. And so on.

Courses are produced at all levels of distance education. A distance education institution must have a system in place for deciding which courses to produce in a given year. Design has to be managed, either by single instructors, as is common in mixed-mode institutions, or by course teams, as in single-mode institutions. One decision relating to course creation might be to purchase materials prepared by other institutions as an alternative to producing them in-house.

Distance educators are no less prone than more conventional practitioners to the syndrome of "we don't do it like that here," so the effective management of change becomes imperative as new tools and new challenges emerge with great—perhaps alarming—frequency. One way of ensuring effective change management is by developing quality assurance policies and practices that permeate the institution or program. A continuous cycle of quality review helps ensure that all parts of an institution and all the people in it remain aware of the need to evaluate and improve what they do.

3.5.1 Supporting Student Activity

Issues such as open admissions and use of transfer credit will often affect the way distance-teaching institutions relate to other institutions in the same system or in others. Issues such as those listed here are likely to be easier to resolve in single-mode than in dual-mode institutions, where existing policies for conventional delivery may conflict with the needs of a distance education program.

The area of student support services is central to the success of any distance learning program. Often overlooked, student service policy issues directly impact prospective and current distance learning

students. In particular, institutions need to develop distance learning policies on student advisement, counselling, the library, marketing, materials delivery, textbooks, training and proctoring.

It is important that distance learning student service policies maintain the same student-centred focus as on-campus student service policy, It is critical that current student service policies be reviewed with the distance learning student in mind. It may be helpful to work through the steps that students must take to learn about, enrol, participate and successfully complete a distance learning course.

3.6 Technological Issues

Distance education depends on the effective use of communications technologies. In a distance education system the use of all human and technological resources is planned. Within the system are subsystems, the most important of which are the design subsystem and those for instruction and learner support, evaluation, and production.

Only a certain number of courses can be designed, produced, and delivered in a given year. So there must be a systematic way to select the right courses, to bring together the right people in design teams, to organise their work so that it fits in with the output of publishing, broadcasting, and telecommunications divisions, and to control and co-ordinate the many tasks required to produce a course of high quality, on time, and at acceptable cost.

People have taken a number of positions on the cost-effectiveness of distance education. Some argue that using communications technology requires too much capital investment, while others counter that technology is less expensive than conventional, labour-intensive methods. The middle position is that most programs do not necessarily require high technology, and even those that do may still be cost-effective if they deliver effective, high-quality instruction, in areas that would otherwise lack it.

4. Work Done by the Project Group

As all experiments carried out by the partner institutions have shown, the major issue in introducing ODL courses is their integration with the existing academic environment. There hardly ever is a problem with running pilot courses, because lecturers offering them and students taking them usually are highly motivated pioneers. When institutionalising ODL, the situation does however change. It is not only organisational, but also cultural issues that are raised, such as students taking distance courses offered by other universities. As long as courses are designed by lecturers from academic institutions with the same or a familiar cultural background, i.e. from the same country or from well-known partner institutions inside the European Union with whom a common understanding has been developed in student and staff exchange programs over now several years of successful cooperation, this is not a really big issue. The only remaining real barrier then might be the language in which the course has been developed. A very important lesson learned in this context, though some might not like it too much, is that if courseware is written in English there is a much higher chance of reuse. This arises the issue of cultural dominance, but is in reality the only way of developing courses for a wider European audience. That is probably why choosing English as second language version after the native language of the country where the software is developed has been such a successful strategy.

As a first step ODL-based material can be used to support students who have to sit in traditional mass lectures to better understand the material presented there and to offer them contact with internationally recognized experts in areas where knowledge is not locally available. The ultimate goal should be to replace purely frontal lectures to free academic staff for seminar style teaching, which is more successful and more enjoyable for lecturers and students. Students can come to class better prepared and instead of having to be taught basics, they can start to discuss substantive issues and ask questions, thus making the teaching more interactive.

As a look at several very successful examples has shown, the key success factor is to develop an institutional strategy right from the beginning. Otherwise different software and development standards will quickly cause a certain amount of chaos, which might be creative in the first phase, but will lead to a structure that is not maintainable in the long run. As ODL development is a software process, lessons learned from general software development do apply. That is why qualified technical support from a

centralised service institution is so essential for departments that do not have an information systems or computer science background themselves.

For delivering an ODL pilot program it was essential that the used software environment provided access control functions, communications functions (such as e-mail and bulletin board) as well as contents delivery and management functions. It also helped very much when a dedicated server was setup, installed and managed by the respective university's multimedia or open and distance learning center. An evaluation of a wide variety of tools, comprising several categories of software, was undertaken by the partners of the project. These tools included WebCT, TELSI-PRO, Black Board, Luvit, and Lotus Learning Spaces.

After a survey of existing concepts and implementations, which comprised an evaluation of various institutional strategies, ODL methods, tools and applications, the focus in this first phase of the project was put on an evaluation of the role of students and academic staff. Some benchmark courses were evaluated and the tool evaluation continued. Strategic issues, such as the development process and the maintenance problem, as well as cultural aspects built the focus of the next phase of project. Several aspects of integration, such as the organisational point of view and cultural issues were discussed in the last phase of the first year. Results of the experiments carried out by the partners and the analyses done from different points of view were then documented.

5. Conclusion

The major conclusion is that a successful framework for ODL has to take into account and integrate the following aspects:

- Institutional strategy / policy
- Domestic cultural aspects and the culture of project partners
- Pedagogic side
- Organisational and managerial aspects
- Maintenance and operations
- The technological infrastructure
- Flexibility and adaptability

Provided that a framework and the related process are modular and configurable, the success of the developed approach is not limited to the just one institution or group of institutions it has been developed by. If the above requirements are satisfactorily met, reuse on a European scale becomes possible.

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TRENDS IN TRANSNATIONAL EDUCATION

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Recent Developments in Global Education

There are 84 million students enrolled in higher education worldwide. While in some Western European countries and the United States, postsecondary education is readily available, access to “world class” postsecondary institutions in other parts of the world is limited. This fact and the rapid growth in demographic rates in certain countries create new challenges for educators around the world.

On a global basis, the demand for higher education is growing faster than the supply of higher education. One way of bridging the gap between supply and demand in higher education is using distance education, online education, or technology-enhanced education.

The global application for online higher education is significantly greater than in it is in the United States and Western Europe. In China, for example, the higher education system faces a potential demand from 32 million college applicants although the classroom capacity is only of about five million.¹ Online education is providing a viable alternative.

Another characteristic of today’s global educational market is students, whether traditional school age or adult learners, have more educational options available to them. They are becoming more informed consumers with faster and increased access to information about education or training programs. These trends have resulted in an unprecedented demand for transnational education.

Transnational education is the delivery of education, either electronic or site-based, across country boundaries beyond state and regional boundaries. Currently, nearly 500,000 foreign students study in the United States. Some of these students study in the United States because they want the cultural experience or to attend a specific university. However, a significant number of students attend U.S. institutions to access a broader university education than available in their home country. In fact, for every foreign student studying in the United States, there are three to five students who would have participated in a United States based education if they had the access or the resources.²

Due to these trends, there is a significant increase in the number of institutions that have started to market and distribute their distance education in other nations. Many have set up branch offices in other countries.

Another recent development in the global education market is the substantial growth in corporate universities. Corporate universities are formalized corporate learning programs that cut across all company and country divisions. By the year 2003, expectations are for approximately 3,500 corporate universities, up tenfold from only 200 in 1970. In the year 2000, 1,600 companies had a corporate university.³

A report commissioned by former U.S. President Bill Clinton studied the use of the Internet in all levels of education to enhance learning opportunities for all students around the world.⁴ The focus of the report was to make lifelong learning a practical reality on the promise of the Internet. The report calls on the public, federal and state governments, and the corporate private sector to collaborate in developing and funding high quality content and applications for online learning.

The aforementioned trends in transnational education all demonstrate the new challenges and demands for institutions providing education and training. In order to meet these challenges and demands, an innovative approach and new methodologies are required. Both higher education institutions and businesses involved in training programs and corporate universities, must be more dynamic, accessible, and quality focused to address the demands of students in the Knowledge Age. The current dynamic environment should encourage educational institutions to work together with private sector efforts to provide quality in their educational and training programs. Technology-enhanced education and training programs, which cross national borders, also require quality assessment.

GATE®

The Global Alliance for Transnational Education® (GATE®) was established in 1995 to address issues of quality in transnational education. GATE is an alliance of business, academic, quality assurance, and governmental and intergovernmental institutions. GATE concentrates on the following activities:

- Setting up quality standards in transnational education (Principles of Best Practice for Transnational Education)
- Evaluating the quality standards in institutions and accreditation of educational institutions, programs, and training courses
- Providing information on transnational education, trends in technology enhanced education and e-learning to its affiliates

All these activities assist institutions and companies in their implementation and enhancement of quality standards in cross border learning activities. As education crosses borders at all levels, and at different kinds of institutions, GATE's focus is on all educational, training and learning activities.

GATE's Governing Structure

GATE is governed by a Board of Directors. This Board is made up of global representatives from education, business, government and intergovernmental organizations. Board members set policies for the future of the for-profit global alliance. The Board decides on broad issues ranging from long strategy to special affiliate partnerships and individual or organizational affiliates. The GATE Board is assisted in their decision making by the recommendations of the different Advisory Committees. GATE's three advisory committees are the Academic Accreditation and Certification Advisory Committee; the Electronic Library Resources Advisory Committee, and the Employer Approved Accreditation and Certification Advisory Committee.

The Registry of External Reviewers

GATE maintains a global registry of experts who actually carry out the GATE Accreditation reviews. Nomination of appropriate individuals for appointment to the Registry may be made to the GATE Academic Advisory Committee, which considers the nominations and decides whom to appoint. Reviewers possess extensive experience and expertise in quality assurance and assessment of education, corporate training and/or online programs. GATE reviewers are usually high level officials in Ministries of Education or Accrediting Agencies in their own countries.

GATE Accreditation and Certification

Through the expertise of its Academic Accreditation Advisory Committee and the Reviewers, GATE has drawn up a set of "Principles of Best Practice for Transnational Education Institutions" to guide corporations and educational institutions across the world. GATE offers a service whereby an institution of higher education, primary institution or training organization can be independently certified as adhering to those Principles and providing transnational education of the highest quality. This accreditation or certification is normally requested by an institution but, with the agreement of the institution, could be carried out at the request of another appropriate body such as a government; or a quality agency or a corporate training organization. The unit of analysis may include: a course, training curriculum, degree program or an institution or corporate university.

The focus of GATE Accreditation and Certification is consumer protection but it is intended not only to assess the existence and effectiveness of the procedures currently in place for achieving quality. It assists in the improvement and preparedness of an institution to be more adept/competitive for a global educational market. Therefore, although Accreditation and Certification is a yes/no decision, GATE always provides recommendations for improvement in either case. GATE may also comment on the *type* of institution or the *designation* of its programs.

Governments and national systems may wish to use GATE Accreditation and Certification as a check on the quality of education being exported by or imported into a country. Another systemic use would be to assist in an international credit bank situation, where there is a need for a central repository and central system of quality assurance.

GATE and Other Accreditation Systems

Although GATE is a pioneer in the accreditation of transnational education programs, different countries have their own accreditation systems. GATE does not intend to replace these domestic systems. On the contrary, GATE matches our standards to established standards of different countries, however, for those educational programs that cross borders, GATE is the only organization offering a reliable certification procedure.

Principles of Best Practice for Transnational Education

The ten Principles are listed below:

1. **Mission**
Transnational courses must be guided by goals and objectives understood by participants who enroll in them and must fit appropriately within the provider's mission and expertise.
2. **Standards**
Students receiving education and educational credentials through transnational courses must be assured by the provider that these courses have been approved by the provider and meet its criteria for educational quality, and that the same standards are applied, regardless of the place or manner in which the courses are provided.
3. **Legal and Ethical Matters**
Transnational courses must comply with all appropriate laws and approvals of the host country.
4. **Student Enrollment and Admission**
Participants in transnational courses must be treated equitably and ethically. In particular, all pertinent information must be disclosed to the participants and each participant must hold full student status or its equivalent with the provider organization.
5. **Human Resources**
The provider organization must have a sufficient number of fully qualified people engaged in providing the transnational courses, and their activities must be supervised and regularly evaluated as a normal activity of the provider.
6. **Infrastructure**
The provider organization must ensure there are an adequate learning environment and resources for the transnational courses, and must provide assurance that adequate resources will continue to be available until all obligations to enrolled participants are fulfilled.
7. **Teaching and Learning**
Transnational courses must be pedagogically sound with respect to the methods of teaching and the nature and needs of the participants.
8. **Student Support**
The provider organization must ensure that students are provided with adequate support services to maximize the potential benefit they receive from the transnational courses.
9. **Evaluation**
Transnational courses must be regularly and appropriately evaluated as a normal part of the provider organization's activities, with the results of the evaluations being used to improve these courses.
10. **Third Parties**
Where third parties, such as agents or collaborating institutions are involved in the TNE, there must be explicit written agreements covering their roles, expectations and obligations.

The process of Self-study

Those institutions that want to adhere to the above Principles and want to provide transnational education can be accredited by GATE. In terms of the process, people that engage in this process would be expected to write a self-study. The self-study would be written against the Principles; those ten principles that are outlined above. Typically, it takes about three months for the document to be prepared. After a panel of reviewers has conducted a comprehensive review of the institution or organization, a recommendation is made to the GATE Academic and Certification Committee Advisory. They review the findings of the independent reviewer panel. Upon approval by the Committee, the GATE Board would review the recommendation for a final vote. Upon Board approval, the entity would be awarded certification.

Conclusion

The transnational growth trend of the online and electronic delivery of education and training across country boundaries is becoming a reality. Consumers of this education are offered greater opportunities and choices. The challenges for learners, corporations and governments are to understand how to separate the quality and credible programs from those which are less credible. In this environment, an organization such as Global Alliance of Transnational Education[®] (GATE[®]) may assume an important role in assessing quality education. Its "Principles of Best Practices for Transnational Education" provide a benchmark to begin to measure the quality of the education or training in providing a content rich learning experience and serving a diverse student body.

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¹ Moe, Michael, *The Knowledge Web*, Merrill Lynch Education Services Knowledge Enterprises, 23 May 2000.

² Ibid

³ Ibid

⁴ Web-based Education Commission, *The Power of the Internet for Learning*, December 2000

E-LEARNING – CHALLENGES AND PERSPECTIVES

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Introduction

With converging of electronics and communication technologies and the integration of voice, data and images has made possible the penetration of information technology to play a major role in human resource re-engineering in the knowledge networked environments. The whole scenario synergies into the concept of providing education or learning on demand and leveraging information and expertise to improve organizational innovation, responsiveness, productivity and competency. The human resource re-engineering assumes greater significance in the new millennium with knowledge management providing a catalytic tool in involving, acquiring, creating, and packaging, distributing, applying and maintaining knowledge databases. The factors concerning critical knowledge management can be identified as culture, leadership, incentives, measurements and technology. While technology serves as a critical enabler of management practices, it cannot do by itself to bring about a cultural change in the organization. This necessitates a knowledge management program should be accessed using clear standards, such as cost savings and increasing patents. It is very clear from the various implementation case studies in the world that by applying a good management framework the improvements in innovations, productivity and competency has been achieved by major organizations. It has been done by adopting re-engineering and re-tooling the human resources who serve as a backbone “human capital infrastructure” of the. Emerging Telecommunications and Information Technologies play a vital role in social development of any nation. In a developing country like Yugoslavia, the Information Technologies and another associated supporting technologies facilitate, catalyze and help in organizing, gathering, structuring, analyzing and making information available for decision makers for devising and implementing various socioeconomic development.

The specific programs undertaken by many Governments to educate citizens are considered to be a major socioeconomic activity. The "Computer Literacy for all" program has been initiated by the Government of Yugoslavia and is considered to be "Mission Activity. To support this activity, the Federal Government has initiated programs and achieved partial success in the literacy drive. Due to various issues, the program is not that successful as envisaged. To think for a solution to this problem, there are two parts; one part is creation of more and more schools, colleges, institutions, vocational institutions and community education programs to cover various levels of people. This requires lot of funding and people cooperation to achieve the goal of educating all. Till now, these programs have been formulated by the Governments from its own funding. Though there are cases of cooperative initiatives taken by various organizations with the support of the Government, Federal and State, there is no significant private participation in terms of funding or other initiations. The second part is to look for technology to provide a solution for this problem. With the evolution of Electronics, Communication and Computer Technology in the last few years, there is a good hope of harnessing these technologies with appropriate selection and evaluation and use these technologies for achieving the goal of education for all programs. With the kind of economic pressures and financial constraints, it may be difficult for any Government to go on funding for the education sector. There is a need for private, public and Government sectors to work together for achieving this unified goal of educating all, and towards achieving this goal, this paper describes a conceptual framework of using technology for meeting the demand on education and providing education for all, any time, any where.

Enabling technologies and globalization

Partnership alliances and cooperative approach are the only solution for providing education and opening education as a limited commercial service in future. In the global scenario, mergers, acquisitions are very common nowadays in the industrial arena. It is forecasted similar acquisitions and mergers in the education scenario in future i.e. this compels us to evolve and work out strategies and plans to give various directions and support for implementation to various agencies/Government, institutions, industrial establishments. The development of Information Technology, computer-communication technologies,

created a miracle of boundary-less universe, thus trying to provide equalities of opportunity and necessary technical, managerial infrastructure using the National Information Infrastructure and integrates to Global Information Infrastructure. When the whole world becomes a "Global Village", the flow of information sees no boundaries. The development of Internet and WWW technologies had proven beyond doubt that there exists possible solution to the problem of education for all supported by the enabling technologies. The enabling technologies such as hardware, software, telecommunications, storage, media, audio, video and other associated satellite technologies are to make the provision of education on demand a reality in various countries. The globalization of education and the possibility of know-how and the show-how shareware between agencies and the nations call for strict compliance of existing standards and evolve new standards for multi-media digital information exchange. The development of object oriented technologies, distributed data processing and the client server technologies evolving multi-media databases, the audio/video compression technologies, have changed the concept of learning and the concept of education as a socioeconomic requirement of tomorrow. Many countries like Malaysia and Singapore are setting up multi-media corridors and given top priority for covering educational needs of the citizens. Though the concept of distance education and education through correspondence had been partially fulfilling the goal, digital delivery of education courseware and education materials through the national information infrastructure integrated to the cable technologies made it possible for citizens to get an access to these resources at a low cost. In addition, they have gotten the possibility to browse through the contents of education materials any time they decide to have an access, adapting to the individual learning ability and need.

Globalization of curricula

Globalization of education requires standardization of curricula and development of suitable multi-media courseware and creation of national digital warehouses containing this courseware, making it available through various enabling access technologies. This brings out a concept of crossing the boundaries of universities, schools, colleges and institutions and creates an environment for access to this education media through multi-modal access techniques and technologies from anywhere, any time. This brings the concept of evaluation of students or a citizen is left to the institutional policies and the certification/award of degrees/diplomas are left to the institution adapting their own evaluation criteria and other requirements. But the scope of delivery of education is changed from "face to face" to individual's desire and needs. This concept provides the best possible educational source and educational delivery. The service providers will get a commercial opportunity of bringing this educational media-ware to the doorsteps of the consumers. This brings in a new way of meeting the learners' demand and fulfilling a long felt need of standard curricula. The change in education courseware and contents now driven by academia are being shifted to learners' driven system. The paradigm shift making the curricula for meeting the learners' needs is the concept demanded by learners to be fulfilled by means of evolving information technologies and cooperative participation of the concerned agencies to provide need based education at an affordable cost using IT infrastructure and multi-modal delivery.

Learning partnership alliances

The 21st century will see a global alliance partnership programs to be a reality covering three aspects of partnership alliances:

1. To act as a "*Bridge*" between learners and participating institutions (NTU: National Technological University, USA). One-way transmission of lectures (Sync and ASync mode) with two or multiple ways on teacher-learner- learner computer-based communication, enabling movement of credits and also award of credits.
2. "*Federation of Universities*" (OLF: Open Learning Foundation, U.K.), designs curricula and develop learning materials for distribution to off-campus students without supporting learning environment or assess or award credits but facilitate staff development activities.
3. Acting as an "*Education Broker*" (OLA: Open Learning Australia, Australia) with multiplicity of functions to bring courses of various tertiary institutions but does not have a credit or credential granting authority.

The appropriate mix-up of all the three above type of alliance functions for facilitating a learning environment, support to learners as a broker and also as coordinate the process of development of appropriate media-ware for education is the need of the hour. The global vision for education for all program is going to depend on the choice of right media, integration of various technologies and training methodologies, sustainability in terms of cost optimization for fixed and recurring, acceptance, adequately meeting the requirements of new perceived needs in the education sector. The partnership between educational institutions will be driven by student volume and economies, learner choice and mobility of job and people. The fear of replacement of human touch by machines is one of the barriers for the implementation of these technology-based programs. It is well said and ascertained that educational technology is a significant supplement and not a replacement of human elements and qualitative role of teacher. It is perceived that education is not simply enlargement of GNP but also to produce greater peace and compassion. The nations and individuals use technology to remove the disparity between Rich and Poor, the Developed and Less Developed, reducing the gap between Literate and Illiterate. We have to ensure that increase in use of technology to be catalytic rather than missionary. It is predicted that in the 21st century, learning system will witness more private participation comprising of complimentarily in implementation of the Government programs and policies, implementation priority, institutional commitment, Government-community support, improvising of organizational structure with restructured and re-engineered processes and creating leadership in management. These partnerships in the 21st century will be driven by students' volumes and skill, learners' choice and autonomy, job mobility and people's knowledge and technology independence and globalization of education, thus shaping a strategy for survival of all, removing the territorial barriers and still preserving local/social/cultural/national values. This drives us to the choice of right media, integration of technology and training, sustainability of cost of implementation and support and tries to meet the newly perceived needs. It is conceived and carefully planned and universally determined that education technology is a significant supplement and does not replace the human element and the quality role of the teacher. The supporting technologies for making this vision, a reality are the hardware, software, visual communication, network, communication, the storage, displays security technology, information management technologies and multi and natural language support interface technologies. The implementation of vision 2020 plan covers all levels of education. It proposes strategic alliances between universities, colleges, schools, industry houses, subject experts, cable operators, communication service providers, etc. The alliances and partnerships are multi-level to reduce Government dependency on funding. Multi-communication technologies are to be used. The integrated mix of available technologies such as, Satellite, ISDN, and Wireless in local loops, Mobile and Personal Communication Services. Countries should create certain common resources facilities like studio; media centers for cost effective management of IT resources. Digital Jukeboxes and DVDs should be used for interactive two- way video/audio systems for learner-expert interaction. This necessitates creation of a National Digital Learning Laboratory and also establishment of a National Certifying Agency for the Digital Learning Technologies and Digital courseware. There should be a creation of national archives and national media warehouse for digital courseware, which are shared and integrated to the information infrastructure. This will necessitate cable-telephone integration and wireless information system, technology adaptation along with integrating of LAN, MAN, WAN technologies, thus facilitating students from any university or institution to log into digital warehouse and start his learning exercises for a nominal charge. The learning and evaluation system should be bifurcated from credit assessment and degree awarding system to give the flexibility of registering with any university and earn degrees.

Standardization of curricula and professional certification

Standards play an important role in the area of information technology. The standards have been concentrated till now on the hardware, software, interfaces and protocols. The new demand driving the industry has produced a standard courseware and the certification of the standard courseware to generate proper certified professionals to deliver the goods and services. This is a new concept which has been driving for quite sometime and the concepts have been accepted in-principle by the major multi-nationals like Microsoft to introduce certified courseware for certifying certain professionals to have a standard caliber to support and maintain product and services. It is felt that the need of the hour is to standardize the courseware in the area of social and common concern, a standard curricula to be adopted internationally so that people who graduate from the institutions are immediately employable. Moreover, they possess a quality and caliber to do a service irrespective of the hardware, software, communication and other infrastructure environment which have been adopted by the industry/institutions. This is a very debatable point to ask whether it is essential to standardize curricula and define certain guidelines for

delivering these curricula to the student community. In order to meet the demand of 'quality education' and acceptability of the degrees and the certificates provided by these institutions, it is further extended to have a certified courseware that is nationally/internationally acceptable. This necessitates demand for a quality, standard educational curricula, especially in a growing technical area like information technology where the instructors also have to upgrade their skills in a continuous fashion to provide a standard delivery of courses with advanced technologies to the prosperous students. A body like ETS may be the need of the hour.

Transformation to information society

Seven Goals are described below.

- a) Connectivity: setting up info-communication network
- b) Community: focussing on group access, not individual own networking.
- c) Capacity: building human skills for the knowledge society
- d) Content: putting local views, news, culture and. announcements on the web.
- e) Creativity: adapting technology to local needs and constraints.
- f) Collaboration: devising Internet governance for diverse needs around the world.
- g) Cash: finding innovative ways to fund the knowledge society.

The Information Society Index, prepared by the World Times and the International Data Corporation, gives one way of measuring a country's preparedness, across four types of infrastructure.

- a) Information: Creating the capacity to send and receive information by telephone, television, radio and fax.
- b) Computer: Extending access to computers in schools, workplaces and homes, building networks and using software.
- c) Internet: Expand the Internet in schools, workplaces and homes and enabling Electronic Commerce.
- d) Social: Building people's capacity to use information through education, freedom of the press and civil liberty.

Thinking schools and learning nation

Education aims to mould minds of tomorrow. Educated person is one who possesses values, the proper mindset, knowledge, skills, a responsive member of the family, a useful person in the society, and a good citizen of a good country. The new economy is built on technology; particularly fast advancing technologies like info-communications, the new revolutions in the life sciences. Speed, flexibility and nimbleness in seizing market opportunities will be critical. Marrying of entrepreneur talents and technological expertise is crucial. So called knowledge based economy requires changes in the curriculum and the teaching strategies. Entails a change in the attitude and the mind-set of every member of community-the learners, educated, parents and the society at large. Science education should not only impart content knowledge but also to develop inquiring mind and problem solving skills. Industry collaboration revolutionizes teaching and learning experience. Thinking schools and Learning Nation is to be the paradigm of the new millennium. In the thinking schools and learning nation, concepts are based on desired outcomes of education such as values, skills, attributes to be accrued at different stages of education. These should provide right range of programs and activities that are to nurture the whole person-morally, physically, socially, intellectually and aesthetically.

E-learning

Learning has become a central feature of the new economy. Technology is rapidly forcing changes in the way business and economy are managed. The forces of globalization and the technological advancements have redefined the nature of international competitiveness such that knowledge or intellectual capital is a new strategic asset for any individuals/companies and the nations. The success of businesses and economies hinge on how well they can leverage knowledge, skills, and creativity to create new wealth.

Therefore, strong business and economies need a talented work force, which are keen to learn and re-learn, highly trained, flexible and adaptable to structural changes and quickly seize new opportunities. In this climate of permanent white water, the life cycles of products and hence knowledge skills are getting shortened. To stay as relevant and employable workers, they need to continuously upgrade and recharge their portfolio of skills and knowledge throughout their lives and to do so at an accelerated rate.

There is no life long skills and life long employment. The new paradigm is "*life long learning for life long employability*". The businesses must also invest in their training and learning processes to speed up their innovation capacities and to explore new and superior business solutions to stay ahead of their competition. For example, Manpower-21 initiative of Singapore Government has the objective of building a nationwide learning capacity and life long learning as central strategy. The manpower 21 articulates the need to invest in the learning capacity of people primarily to take all new challenges of the new economy. Job requirements change very rapidly. Public, private and people sectors work closely to develop school of life long learning, an integrated, comprehensive system to transform on the existing work force into globally competitive workers.

Conclusion

The concepts of certification, standardization and quality maintenance in the curricula comprising of information technology and other subjects are very debatable. This paper initiates a dialogue to introduce such concepts to cut across barriers of monopolies and provide a minimum acceptable standard for educational courseware, delivery systems, evaluation systems, and certification systems, to meet the ever growing demand of professionals. This demand indirectly imposes a standard and quality of information service providers including academic universities that have been set up by the Government and the State to follow these standards. Since IT is pervasive and has impact on every sector of life, the need for standardization and certification need not be emphasized any more and it has become a necessity for adaptation. But care has to be exercised to the environmental and social factors before finalizing the minimum guidelines for standards in curricula and instructional systems. With the inception of Internet and World Wide Web (WWW), the economies of the countries are facing new challenges in terms of networked economy transitions. Ultimately, we are heading towards "*one world economy*" predominantly a network and knowledge dependent, thus proving that information technology is acting as a catalyst for human resource re-engineering in the knowledge networked environments.

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THE POSSIBILITY OF DEVELOPING E-STUDIES AND THE EXPERIENCE OF SCHOOL OF BUSINESS ADMINISTRATION TURIBA

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Introduction

The full time professional distance learning program in Business Administration implemented by School of Business Administration Turiba is the only form of Computerised Distance Learning or E-studies being implemented in Latvia at the present moment [1,2]. The essential prerequisites- more importantly access to the Internet and the number of potential students- for the development of such learning programs in Latvia have been analysed in this paper. The essential application programs and the prerequisites for the development of such learning programs have been evaluated taking into account the further development of the system. The experience gained in the process of education of the students has been analysed.

The analysis of the specifics of Latvia

Rapid changes in economics in relation to the widespread usage of the information technology can be observed all over the world. In these circumstances, it is essential to explore the possibilities of development of the educational process as a form of business in Latvia that integrates the new economic features. Developing a new educational process it is essential to research the demand and conditions that could influence the development of business. E-studies (Computerised Distance Learning) fully corresponds to the usage of information technology in the educational process by way of provision of study material over the Internet. In order to implement this process, it is essential to ascertain the number of potential students and the possibilities of Internet usage.

The number of students studying in Higher Educational Institutions in Latvia (see table 1) has essentially been on the rise over the past few years and this trend will continue over the next few years under the impact of the current demographic situation. The number of correspondence students has been rising proportionally (see fig 1) This trend supports the inference that the demand for correspondence studies would remain stable over the next few years. The form of correspondence education has also changed in the course of time and the form of sending tests by post is hardly existent. Usually, correspondence studies provide study sessions, however these are also not always accessible. Consequently, the possibility of developing study courses over the Internet is very tempting.

Table 1. Higher Educational Institutions and the enrolment in Latvia [3]

	1990/91	1995/96	1996/97	1997/98	1998/99
Higher education institutions	10	28	30	33	33
Enrolment, thsds	46	46,7	56,2	64,9	76,7
Of which departments :					
full-time	29,1	33,8	38,4	41,9	47,2
evening	3,3	1,5	1,6	2,4	3,7
correspondence	13,6	11,4	16,2	20,6	25,8
Enrolment per 10,000 population	172	187	227	264	314

At the end of the 1999, there were 9.1 computers per 100 inhabitants in Latvia (in comparison Lithuania had 5.9, Poland 13.7, Russia 4, Europe on average 28) and in comparison to 1998, the figure had risen by 21.7%. According to 1998 figures, 87% of computers were used by enterprises. In the second half of 2000, 9% of people had computers in their houses [4].

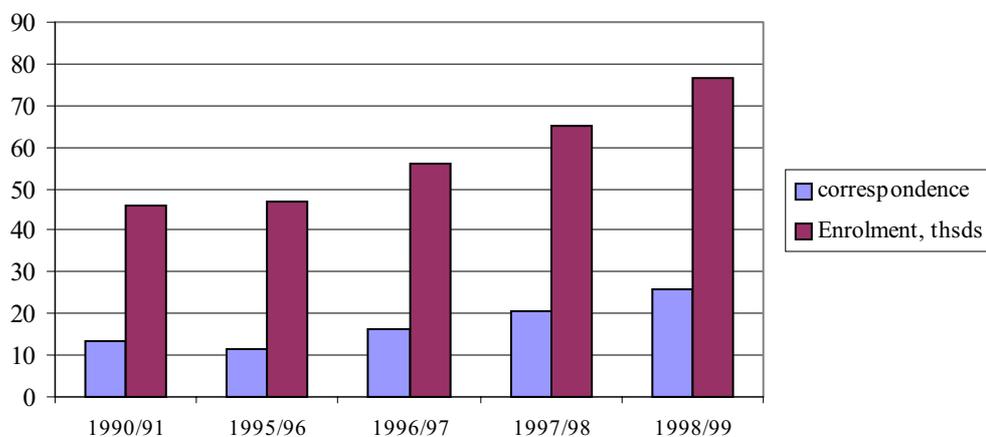


Fig 1 The number of students studying in Higher Educational Institutions and in correspondence courses, thsds

The greater part of the Latvian inhabitants cannot afford to have a computer for personal use and this is owing to the overall economic situation in the country. The increase in the overall proportion of computers to a large extent is due to computers procured for business purposes as well computers bought for private use by inhabitants with high income levels.

The other important factor is the accessibility of Internet connections. In 1999, Internet users who had availed the Internet over the last 6 months reached 113,000 in Latvia, which is approximately 6% of all Latvian inhabitants (as compared to Estonia - 21%, Lithuania - 5% and Russia - 1.5%). In the first half of 2000, the figure increased to 240,000 (approx. 13% of all Latvian inhabitants); moreover 70% of them regularly used the Internet - at least once a week [4]. It should be mentioned that the data on the number of Internet users could be interpreted in different ways owing to the different methods of gathering information.

The survey conducted by BMF Gallup Media shows that only 0.4% of Latvian inhabitants belonging to the lower socio-economic class have access to the Internet, 4% of the lower middle class and 15 % of the upper middle class have access to the Internet, whereas the figure among "the cream" of the society is 30% [4]. It could be inferred that the accessibility to the Internet sharply changes depending upon the socio-economic level of the inhabitants.

BMF Gallup Media survey purports a disparity in the accessibility to the Internet in different regions. The survey purports that on average 9% of inhabitants have access to the Internet in Latvia, 15 % of inhabitants of Riga have access, 5% of inhabitants of other cities and only 2% of the inhabitants in the countryside have access to the Internet [4]. A still further disparity can be noted, if the accessibility to permanent connections are considered.

Precise data on Internet connections of enterprises are not available, however, Internet connections in enterprises are becoming more and more accessible and popular. Practically all major enterprises and state administrative institutions avail the Internet and it is said that on the whole approximately one third of Latvian enterprises make use of Internet connections. Recently the number of connections has certainly been on the rise and accessibility to the Internet would especially increase with the improvement in the quality of the connection and with the increase in the number of connections in smaller cities.

The next significant factor to be ascertained is the possibility of paid study courses or financial sources as the development of E-studies is only possible, provided there is long term stable funding. Latvia has a rather high percentage of students, studying for a fee (see table 2) and this creates the possibility of developing a commercial educational system.

Table 2. Enrolment in higher Educational Institutions: studies financed from the State budget and for a fee, at the beginning of academic year 1998/99 [3]

Higher education institution	33
Of which private	13
Enrolment in higher education institution, thsds 1998/99	76.7
Of which studies financed from the state budget and for fee:	
students receiving tuition funded by state budget	32.8
students receiving tuition for a fee in State higher education institution	35.5
students receiving tuition for a fee in private higher education institution	8.4

A relatively high number of paid students (Fig 2) (approx. 57%) indicate the high value and relevant demand for education. Of course it is important to choose the field of study wherein it is effective to develop the distance learning program using the Internet.

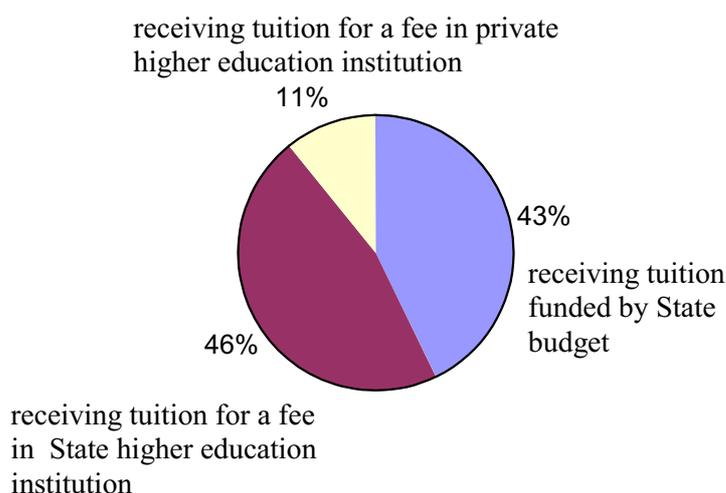


Fig 2 The number of students studying in Higher Educational Institutions for a fee at beginning of 1998/99

The contingent of people interested in Computerised distance education

The research on the demand for distance learning and the experience gained from the implemented computerised distance learning pilot project has shown that this educational form is and will be successful only if there is a provision of obtaining a fully accredited diploma. The demand for mastering special study courses is practically non-existent. This brings us to one of the main basic principles of this program: It is necessary to work out methodical support and a study support system for all the study courses of the study program in order to make this distance learning program cost efficient. So, practically it is necessary to provide the methodological and organisational support for the functioning of a virtual higher educational institution.

School of Business Administration Turiba has at present implemented this Distance Learning Program only for the speciality of Business Administration.

The first experience showed that only 5% of the total students opted for individual study programs. Analysing the age group and the place of residence of students who have started studies in this Distance Learning Program in order to obtain full higher education, one can get a profile of persons interested in E-studies [1].

More than 50% of the students are from 30 - 40 years old. These are people who weren't taught computers at school, but are confident in their abilities. They are persons, who have attained a certain status and higher education is an essential prerequisite for their further career development. It can be seen that a big part (a little more the half) are students from Latvian districts. Considering the fact that half of the population and a much greater part of business is concentrated in Riga, it can be inferred that people living outside Riga are especially interested in such form of education. Combining work with studies, there is no other possibility of obtaining education for them. Their workload is so heavy and working hours so irregular, that they can't study in the day department. Moreover, most of them have families and have to raise their children. Their level of income is also such that they can afford to opt for paid courses.

The implementation of E-studies program

The Computerised Distance Education program for Bachelor studies, implemented at present corresponds the 4-year day department program. The point of reference for Computerised Distance Education students are so called academic years that are in accordance with the program of the day department students. At present the program is being implemented in Latvian.

Any standard Internet browser and E-mail program can be used to study in this program. The methodical study materials are designed in such way that there are no technical restrictions in the use of the study material. The audio files provided offer listening possibilities for mastering foreign languages.

In order to ensure the possibility of mastering the higher educational program of the speciality of business management through the Internet, it is necessary to provide the full methodical support for the study of about 50 study courses. The methodical support of each individual study course comprises lecture notes, self assessment tests, access to normative document packets - laws, regulations of Cabinet of Ministers of LR, resolutions etc., the study course program, tests and study paper packets and instructions, and a list of literature.

The study process occurs in the following manner. Each student has access to a full packet of methodical support material (including tests) of the respective study course on his personal home page. Students study from their electronic lecture notes (in case of necessity, they can be printed), fill in the respective tests and hand them in using the E-mail. Upon sending the test the student receives a notification of receipt on his home page. Following evaluation of the test, the student can see his mark. Moreover, on the home page the student has access to the submitted test along with the teacher's comments and corrections. The student, therefore, can analyse his mistakes. Using the electronic board (Bulletin Board System BBS) the student can request consultation with teachers of any study course.

Before passing an exam, which takes place in person, the student can test his knowledge with the help of self assessment tests, where in case of wrong answers the program points out the part of the course where he can find the right answers.

Students are not bound by any strict study schedule. If all the tests in a course have been passed, the student can contact the Computerised Distance Education department and arrange to personally pass the exam. Upon passing all the exams of one academic year the student can conclude a contract for the next year.

On average to complete an academic year, the student has to pass 40 tests. So, to complete the course in an academic year, the student has to send in 1 or 2 tests a week. Moreover, an exam or final test has to be cleared at the end of each course. There are on average 12 exams in a so-called academic year.

The experience gained and conclusions

Two years of work on the design of the project and co-operation with tens of distance learning students revealed a string of additional problems connected with the training of teachers, organisation of students tasks, specifics of methodical material etc. The biggest problem is connected with the training of teachers on the design of specific methodical provisions. Teachers working with day department students face considerable problems reorienting to work with distance learning students as it is necessary to specially tailor the methodical material. There were also problems directly connected with the use of methodical materials designed for day students, for instance, often day students can use books of different authors that cannot be used by distance learning students due to restrictions regarding copyrights. Most often

study materials have to be specially designed. Special attention has to be paid to the organisation of the student's tasks. Fewer than 30% of the students are able to work independently. In order to activate independent student participation, special methodology has been developed.

The above mentioned problems regarding activating the student is generally known but its specifics strictly depend on the local circumstances. It is not possible to simply adopt solutions used in other regions of the world. In most cases the appropriate individual and effective solutions have to be designed to solve the problems. The implementation of the program showed that the reviewed form of education could be rather cost efficient in Latvian circumstances. However, first of all, considerable resources have to be invested in the design of an effective educational system.

The present original methodical support system, designed specially for the provision of E-studies includes software packet for 50 study courses, student's register and other administrative functions. A couple of hundreds of directories and thousands of files ensure the provision of such a system. All this characterises a new virtual Higher Educational Institution, that could be managed by just a few people. On the other hand, there are tens of teaching staff and the methodical support designers, which is considerable. The separation of the provision of the methodical support from the central management software and the standardisation of the methodical support has provided the opportunity of making the process of design of methodical support utmost effective. At the present moment more than ten persons are working together without any problems. The functioning of the system and the analysis of the design process showed that the proposed architecture along with the designed software ensure the possibility of widespread co-operation including international, as well as the development of the analysed system and its implementation with real content. A few people without any difficulty can co-ordinate and manage the design of the methodical provision, which in fact could be dispersed all over the world.

The students have no problems accessing the methodical provision from any part of the world using the Internet connection. This opens wide possibilities for international co-operation, such as, the launch of a new joint program.

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E-LEARNING 2.0: THE AGE OF INTER-CONTEXTUALISM

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Introduction

The Internet creates a new kind of learning: E-learning (EL). One of the important characteristics of EL is its inter-contextualism. Inter-contextualism is the phenomena of breaking the barriers between work-school-leisure, between schools-universities-training departments, and between different cultures. The new technology that enables the inter-contextualism is XML (Extensible Markup Language). By XML we can re-purpose a given set of "learning objects" into different contexts. This re-purposing leads to a new era of learning. From broad-casting by books and televisions (mass media), to browse-casting by browsers or "mass personalization" and "mass customisation".

Background

"Things begin to change only when people start recognising what is now possible that wasn't possible before" George Lucas wrote in 18/03/01. What is now possible in learning that was not possible before the Internet?

Since the printing revolution in 1457 and the industrial revolution in 1750 the world has been moving from narrowcasting to broadcasting. Now, since the invention of the Internet browser in 1993 it is moving from broadcasting to browsecasting.

The invention of the printing press resulted in a transition to a new way of life. Printing is the first model of mass production and distribution of information. Subsequently, with the introduction of machinery to the world of textile in around 1750, tangible merchandise was also mass produced and distributed. In the space of 300 years, the world switched from individual production and distribution of information and goods (narrowcasting) to mass production and distribution (broadcasting).

Printing and textile machinery enabled the transition from individual, customized products in small quantities to mass production of the identical product in large quantities. This revolution brought about a new way of life called "modernism," in educational terms called "homogenisation". Television, radio and cinema are also based on the same principles of production and mass distribution of print and industry, which have existed since 1457. All this has come to an abrupt and total change with the advent of the Internet revolution in 1993.

A New Synthesis

Since the Internet revolution in 1993, the world has undergone another transition to a different way of life, post-modernism. This paves the way for a new synthesis between mass production and distribution of broadcasting information and merchandise and individual production and distribution of narrowcasting.

This synthesis finds expression in Internet-based electronic commerce (e-commerce), electronic learning (e-learning) and electronic entertainment (e-entertainment). The new format of commerce, learning, and entertainment is based on surfing between Internet sites. This has become possible with the invention of the web (familiar to us as www) in 1990, and especially with the invention of the browser in 1993, such as Navigator of Netscape or Explorer of Microsoft.

A New Environment

What Internet commerce, learning and entertainment have in common is that they are all based on browsecasting: broadcasting via a browser. The characteristics of browsecasting are:

- Efficient distribution of information.
- Extensive scope of information distribution.

- Continuous contact between customer and supplier is possible 24 hours a day.
- Customised, individual products or services are possible (lessons, software, etc').
- Large groups of people with common interests can interact.
- Distances between working and learning, entertaining and learning, are eliminated.
- Fluidity and real time.
- Everything is open to bargaining.

As a result of the above characteristics, merchandise markets have developed on the Internet, and not only for stocks and bonds. These markets are Internet markets for information, knowledge, learning, etc.

Eliminating distances: The digital global village eliminates distances, and boundaries no longer protect local monopolies or local firms which are not monopolies. Due to shrinking distances, the digital global village, like other small villages, limits the number of competitors. How many investment banks do you need in a global village? Schwab? Merrill Lynch? E-trade? How many book stores do you need in the village, Amazon, Barnes and Nobel? At the end of the 20th century, the multiplicity of cars and highways, strengthened the shopping malls and national name brands at the expense of the local stores and the non-name brand products. In the beginning of the 21st century, the multiplicity of Internet users will increase the global name brands (from Macdonalds to Amazon and global insurance companies) at the expense of the local agents and national brands. We will be witness to global players of EL: "Nokia of EL", "Ericsson of knowledge management", "Microsoft of learning", "Cisco of virtual universities", etc'.

Shifting of information down to all levels of the organization and to the customer environment: In the digital global village information has a high resolution level previously unknown. This high resolution is a result of a new type of communications, which surfaced, only in the end of the 20th century. The resolution of information in digital communication unlike analogous communication is almost infinite, because it sifts down to all levels of the organisation. Organisations, which succeed in bringing their organisational wisdom to all levels of their organisation and to most of their customers, have a competitive edge over others. These will create heterogeneous channels.

From the business of atoms to the business of bytes: more and more people are moving from manual labour based on machinery (industrial economy) and from manual labour on the ground (agricultural economy) to work using brains with computers and communications. More and more people switched from production of cars and tomatoes (atoms) to production of articles and data (bytes).

Since the beginning of the 80's there are more information employees in the United States than industrial and agricultural employees put together. The computer and the Internet are "the plow," "the production machine" and the "transportation machine" of the information economy. Economic and technological changes are the background for the revolution of the past year in electronic trade and electronic finances.

The Birth of the New Education (like New Economy and New Media)

Peer to peer learning inside global universities: Electronic trade characteristics transform the world not only into a global village (as McLuhan said in 1962), but also into global universities. These universities bear two important implications:

A, Contact with the learner is personal and the prices are cheaper: the teacher does not need mediators or go-betweens. He learns the taste of the learner and matches products to the learner's individual taste, like a small school in a little farming village. Moreover, the buyer-customer does not need go-betweens. The customer can engage in transactions, such as choosing books out of a selection of 4 million, or selling stocks, from wherever he is, as long as there is a terminal (P.C., PDA, Internet TV, Cellular, etc').

B, In a small village there is no place for numerous competitors: Microsoft may be the first "global store" in history. The next candidates are Cisco, America Online and Commerce One. Since the digital world eliminates distances, there is a tendency for one company to dominate the market in its field and to become a monopoly or a gorilla.

Natural, contextual, and heterogeneous E-learning:

A, The Graphical User Interface (GUI) enables the beginning of the Internet revolution in 1993 through the Mosaic browser (the pre Netscape Navigator). The E-learner wants a Natural User Interface (NUI). NUI is composed of a synergy between voice interface, visual interface and intelligent interface. The visual feature of NUI can enable the users to understand the body language and facial expressions of teachers and peers. The intelligent feature of NUI can enable the users to get online help from TeacherBots. A new mixtures of XML and AI technologies have already created intelligent Bots which communicate with voice, face and intelligence.

B, The contextual E-learning enables just in time and just in place learning. For example, if we are in a museum and we don't understand some ancient item, we can learn about it just in time through our mobile Internet terminal. Even more than that, our mobile service provider can know that we are in the museum area and notify us about the learning possibilities which we were not aware of.

C, The heterogeneous E-learning enables us to learn in heterogeneous environment (anywhere, anytime) by heterogeneous means (PC, Internet TV, and Handheld). We will have one passport that will give us a universal "Internet Identity" which will accompany us in different contexts.

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WEB-BASED INSTRUCTION; A PARADOX AND AN ENIGMA IN INSTRUCTIONAL PARADIGMS AND DESIGN PRINCIPLES

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Thesis Objective

The hypothesis of this paper is to present to the reader an argument as to whether existing instructional paradigms and design principles, philosophies, pedagogy, and practices require revision to effectively teach web-based instruction. Due to the length restrictions of this paper the reader is advised that not all paradigm's, philosophies, and practices are included, and those that are evaluated as to their usefulness in web-based instruction are very limited in scope, definition, and explanation. In all probability you will find that this paper will ask more questions than it answers, but in doing so will hopefully stimulate each of us to critically view and analyse the effectiveness of the current and prevailing practices employed in web-based instruction.

Background

As early as 1973 Daniel Bell, and later in 1980, the futurist Alvin Toffler identified several massive changes that our society has undergone: from the agrarian age to the industrial age, and now entering the information age. These futurists, among others predicted a complete change in our societal values, and the reforms that would be necessary to accommodate the change from an industrialized to an information based society. In many cases, these futurists were correct in their predictions, and our society today is indeed mired in the process of adjusting itself to accommodate this new age of information and technology.

In looking at our educational systems and the population of students that these systems serve we find quite a vast array of scope and difference among students.

Demands upon and within the educational sectors are changing. For higher education, demographics and workforce changes are fundamentally altering the student population. In 1995, 44 percent of all college students were over 25 years old, 54 percent were working, 56 percent were female, and 43 percent were attending college part time. In 1997, more than 76 million American adults – 40 percent of the adult population – participated in one or more adult education activities, up from 32 percent in 1991 (National Centre for Education Statistics).

Today a students' lifestyle and objectives are also very different than those students of yesteryear. It is not at all uncommon to find that today a typical student may be a single parent, who may be working two or more jobs to make ends meet in order to provide for their family. This same person may want to pursue a higher education, but may be unable to do so as a result of time commitments and constraints that are usually and traditionally required in institutions of higher learning. Additionally we find that many students do not have specific available time blocks, which they can reserve or allocate to a particular course or educational unit of instruction on a regular basis.

More students than ever before engage in learning programs that offer courses at nights or weekends. Some educational institutions even offer courses on Sundays – which in some religions could be considered a sacrilege! Additionally schools have realized that in order to sustain themselves and to remain competitive they must adjust their offerings to accommodate this diverse and ever growing population of students.

As a result of newfound technological advancements in the fields of computer technology, education, and instructional technology, we find that web-based instruction is becoming somewhat commonplace in what would be considered traditional higher educational settings. Many schools now conduct a minimum of some type of web-based instruction. Additionally an entire new industry of web-based instruction has risen to compete with the universities in this endeavor.

In those otherwise traditional institutions where the implementation of web-based instruction has been implemented, the school is assisting the non-traditional student in the meeting of their educational goals and objectives. The school is also meeting its' own social obligation to educate even the most non-traditional of students. With the movement toward web-based instruction well underway, the question and thesis of this paper, is whether prevailing instructional and design practices are suitable to effectively support the non-traditional student in their use of web-based instruction.

Instructional Paradigms & Theory

A paradigm as defined in Webster's Encyclopedic Unabridged Dictionary of the English Language is an example serving as a model and/or a set of forms all of which contain a particular element...based on a single stem or theme. Therefore in extrapolating and interpolating the term instructional paradigm we could state that the definition would be a set of forms or examples of educational theory and practice based upon particular elements. You could in a broader sense regard this as the practice or pedagogy of instruction and/or design.

Probably the most noteworthy expert on instructional design paradigms is Robert M. Gagne, who authored the *Principles of Instructional Design*. Gagne bases his paradigms on the belief that instructional design efforts must meet intellectually convincing standards of quality and that such standards need to be based on scientific research and theory in the field of human learning. Gagne takes into consideration learning outcomes, including intellectual skills, cognitive strategies, verbal information, attitudes, and motor skills. He also considers the knowledge, skills, and abilities of learners and how the differences among learners affect instructional planning and design.

Behaviorism was a term coined by the American psychologist John Broadus Watson (1878-1958) in his paper, "*Psychology as the Behaviorist Sees It.*" It is a theory of animal and human behavior holding that actions can be explained entirely as responses to stimuli, without accounting for the profound influences of interpretation on introspection. Thus an educator who believes in behaviorism would tend to attribute learning as a reaction to an event or action that would stimulate the student, but would be provided by the educator. To the behaviorist, teaching is essentially a matter of arranging contingencies of reinforcement so as to produce and maintain prescribed behaviors.

Constructivism is quite an opposite paradigm of behaviorism as described and defined above. Brunner first proposed the concept of constructivism in the mid-1960's and builds on earlier ideas of Piaget. Basically, the theory of constructivism holds that the learner rather than the educator develops or constructs knowledge and that opportunities created for such construction are more important than instruction than that which originates from the educator. This is certainly not to state that there is not educator guidance or involvement, but that the student essentially will have a very strong voice in the selection and completion of tasks that will aid her in their learning approach to the given subject matter.

Web-Based Instruction

If we look at the delivery of information and learning via web-based instructional systems we find some similarities to traditional learning, however we find more differences than similarities. We find that many web-based instructional systems do indeed make use of stimulants such as movies, sounds, and graphics. We also find that the best web-based instructional sites provide a reference library of sorts, to assist the student in their understanding of the material elements of the particular course. These reference libraries are usually hyper links to other educational or related web sites, which the student can use as a resource to further enhance their understanding of the materials. Some hyperlinks use video and animation to gain and hold the attention of the student, while others are merely "page turner" type of information sites.

But what of the interaction that takes place in the traditional classroom? What becomes of the theoretical arguments that an experienced educator would foster, stimulate, and encourage among the students and/or the educator? What becomes of the personality and strength of conviction that normally results as a benefit of these stimulants? Are they lost in web-based instruction? Can a chat session accomplish and achieve the finer points of theoretical argument without having the face-to-face stimulants and reactions that are readily apparent in a traditional classroom?

The correct response to these questions is that it depends upon the design of the course and the process of delivery that is used. If a web-based course is designed along the lines of the Gagne theory of instructional design, it could certainly achieve and accomplish its' objective. However while the elements of design are crucial and critical, so is the interaction of the students with both each other, as well as the educator. Regardless of how well web-based instruction is designed, if it is designed solely as a stand-alone product without any human interface or interaction it will, at the very least, not meet its' learning objectives or in the worst case the ultimate goal to educate. Most students need interaction and human intervention so as to gain the sociological elements of instruction.

The focus of a recent study by West Texas A & M University on the attrition rates for 15 graduate business courses offered on campus as well via a web-based instructional method reveals some interesting statistical patterns. During a three-year period beginning in 1997, it was convincingly found that MBA courses delivered via web-based instruction experienced a substantially greater attrition rate than did the same courses taught by the same professors in a traditional setting. The overall combined attrition rate for the web-based courses was a resounding 50% greater than the on campus courses, with several courses experiencing an attrition rate of greater than 100% of those taught using traditional methods on campus! Some of the explanations of the higher attrition rates offered by the authors of the study include but are not limited to the following reasons:

- Students were not able to adjust to the self-paced approach.
- The rigor of the study was greater than anticipated.
- Lack of student and faculty experience with web-based instruction.

Of particular concern and note is that courses in the various business disciplines that rely upon mathematics appear to be especially ill suited to web-based instruction. As an example a Statistical Methods course on campus experienced a 13% attrition rate, while its' web-based equivalent experienced an attrition rate of 43%, or greater than 3.3 times the attrition rate of the on campus course. A Quantitative Analysis in Business web-based course experienced an attrition rate of 33% as compared to the same on campus course which experienced an attrition rate of 17%, or about half that of the web-based course! These differences in attrition rates should and cannot be ignored.

In a survey of online teachers and learners recently prepared for the Project Steering Committee of the VET Teachers and Online Learning Project the report indicates that there are several themes running through the comments that are cautionary. These include the need to ensure that the instructional design is correct, and that motivation concerns, as well as the difficulty and confusion of on-line users is taken into consideration during the design process.

Could it be that in our quest to satisfy the masses and provide an educational forum for such a diverse audience is somewhat poorly designed? Could it be that the lack of human intervention or contact is a contributor to the causes of frustration and ultimately to the significantly higher attrition rates of web-based instruction?

In my own personal teaching experience in web-based instruction, I have found that even on the best graphically designed web site, the student needs and will actually seek out interaction with another student or the educator. This human intervention and interaction is crucially required of many students, but not all. Some students are perfectly content viewing and reading information from a computer monitor and learning in this way. But the fundamental question remains: what is the objective of the particular course, and what is the desired instructional outcome? If these two questions do not include the learning of social interaction among culturally diverse students, have we not failed to meet our social obligation to educate?

To illustrate further I have discussed web-based instruction with Professor Margaret West, Ph.D. of Northern Illinois University. In any course in which Dr. West provides web-based instruction she insists on face-to-face class meetings at various points throughout the semester. This allows the students to interact not only with each other but also to be mindful of the humanness of the educator. It allows the educator also to view the humanness of the student, who may be shy, or intimidated by either the web-based instruction, or the human interaction with fellow students. In any event this human interaction

provides a further development of the educational endeavor, and allows for the student to learn the intricacies of the social environment of learning. In a written response to my inquiry as to the necessity of these activities, Dr. West responded as follows:

“In the past, I taught the course entirely online with just a face-to-face kick off and a face-to-face debrief. Feedback from students in the debriefs indicated that they were seeking more external support for avoiding procrastination in the course. They also wanted opportunities to meet with their partner for the partner consulting activity. With that feedback, I decided to add a face-to-face meeting approximately once a month. The goal of the face-to-face meetings is to provide a "check-in" on course assignments so the student paces the assignments throughout the semester, and to provide an opportunity to meet with their partner.”

In having the opportunity to bring to fruition a mix of the traditional class room environment along with a constructivist educational attitude, I believe that the student will learn a great deal more as a result of human intervention and interaction than when merely left alone at the web site to learn. The fact of the matter is that much of web-based instruction includes the ability of the student to engage in forum discussions with other students, and at predetermined times with an educator leading the course of discussion. Additionally in many web-based instructional settings the student can and does frequently send e-mails to the educator or other students. Fundamentally however, these interactions are not human interactions at all. These keystrokes are merely very weak substitute for the actual human interactions that would readily take place in a traditional classroom setting.

As an example in a traditional classroom it could be stated that the educator leads the instructional process in somewhat of a behaviorist viewpoint if the educator uses the lecture technique as his sole means of instructional delivery. If however this same lecturer engages the students in the lecture, and encourages them to participate or to make other contributions to the lecture, it could be said that the educator utilized a constructivist approach to learning. This classroom involvement includes vocal inflections and facial expressions that currently cannot be conveyed via web-based instruction.

Certainly there are numerous other theories of instruction that could possibly demonstrate arguments on either side of this thesis. As an example, lets briefly consider problem-centred learning, within the element of web-based instruction. One of the most noteworthy educators of our times, Dr. Thomas M. Duffy of Indiana University and Unext.com is a strong proponent of problem centred learning in a web-based environment.

While I certainly do not possess neither the education, the credentials, nor even the experience to argue this point with Dr. Duffy, I believe that I can respectfully suggest at a minimum that problem centred learning on the web, may not be suitable to every student. Once again, without human intervention and the social implications and benefits that this type of interaction provides to the student, the student may eventually find themselves lost in their ability to intellectually and emotionally engage in the most simple of arguments or discussions.

Aside from the normal fears that some students have relative to their ability to function within a personal computer environment, what other fears may exist if we enrol this student in a web-based course to which he may possess little or no knowledge, and then “throw her to the wolves” using a problem centred scenario? I fully realize that even in a problem centred scenario there are on-line resources available to the student including chat forums, additional reference materials, and even periodic and timely assistance and feedback by the educator. However, without having any academic knowledge of the subject matter, coupled with a possible fear of the personal computer environment coupled with usability issues within a problem centred scenario, with little or no in-person intervention available would appear to me to be a situation that would have a high likelihood of failing to meet the learning objectives of that particular course of study. Even if specific learning objectives were met and determined to be successful, have we not failed to provide the student the type of human interaction and socialization that may assist them overall in their particular vocation? Why would we want to place a student in the position of potentially passing a course of web-based instruction, but not learn the art and beauty of social interaction and behaviour coupled with intellectual stimulation and constructive argument?

On the positive side most web-based instruction does provide discussion forums, discussion groups and e-mail capability. I do believe that we can definitely enhance the students' ability to write philosophically and intellectually as a result of these forums. I also believe that using these forums will indeed enhance the educational benefit of web-based instruction, but not necessarily to the same extent that web-based instruction coupled with human interaction could or does.

Conclusion

The solution to the issue of designing an effective web-based instructional model lies in the answer to the following question. In which ways can web-based instruction bring both the best instructional process to the student, as well as bring about the convergence of a stimulating and encouraging environment of learning while meeting learning objectives within a social environment? Is a shift in design and practice paradigms necessary, or are what we are experiencing merely a juxtaposition and congruency of the instructional design principles of Gagne, coupled with the principles and practices of either the behaviourist and constructivism approaches to learning?

Is or will it ever be possible for us as a society to provide the same type of interaction that takes place in classrooms via web-based instruction? If so, will we lose any of our abilities as educators, or will web-based instruction create more clearly defined challenges and obstacles to the educational process? Will web-based instruction be able to take advantage of alleviating distances between the masses while still being in a position to provide a quality education, or will web-based instruction fall by the way side as merely a technology fad that was temporary at best?

With only limited research or empirical data and/or analysis available on this topic or of the effectiveness of web-based instruction to accomplish learning objectives, we can all pontificate and engage in this type of hyperbole. My own personal belief is that a combination of the tried, tested, and scientific principles of instructional design and educational pedagogy must be employed in order for web-based instruction to succeed. I don't believe that under any circumstances should proven instructional principles be sacrificed in order to serve the masses more efficiently. I do believe however, that in order to succeed with the same or exceedingly difficult goal of increasing the benefit of the educational experience to the student, that a new type of web-based design and instructional practices, principles, and pedagogy will emerge. A new type of instructional delivery system will continue to emerge and evolve as a result of technology advances and convergence in the way of high-speed cameras, video, and real time conversations and high-speed video conferencing.

A new type of educator will also emerge. This will be an educator who has had the experience of teaching in a traditional classroom setting but is able to take advantage of the technology to bring forth a better delivery method of instruction within a web-based instructional setting. This will be an educator who believes that personal intervention within a web-based environment is not only necessary for the student, but also for the educator and indeed will provide a valued sociological benefit to both.

Is web-based instruction a suitable alternative for all subjects, for all students, and/or for all institutions? The unequivocal response to this rhetorical question is of course not. Each of us possesses certain behaviours, skills and attributes, which allows us to learn. We are as different in these processes as the night is from the day. Web-based instructional methods are only a single source utilized to expedite instruction. Some students will continue to use the services of a traditional institution, coupled with web-based instruction, while other students will be more suited to the rigors of a traditional classroom situation.

Will we require making a committed and concerted effort in a paradigm shift? I am not certain that a complete shift in tried, and tested philosophies, paradigms, and methods is as necessary as is the return to the fundamental approach to education which is to recognize the uniqueness and differences in learning styles and learning patterns that distinguishes us as human beings, students, and individuals. Only with the acceptance of these learning differences can we as instructional designers, and educators utilize the technology resources to reach the masses. Only with this recognition of differences will we be in a position to challenge and to establish new paradigms of instructional design philosophy. Only with the recognition of these differences will we establish and possibly redefine the instructional philosophies and practices, which currently exist within a web-based learning environment.

Time, experience, technology and the dedication of educators and students to attempt new methods of delivery and instruction will be one of the bases of foundations for any new or re-configured paradigms and/or instructional practices that may come into existence in the future. The evaluation of these success and/or failed attempts coupled with only the passage of time will eventually allow us to effectively evaluate the changes necessary to determine if a shift in educational paradigms, philosophies, dogma and practices are required to suit the information age, and more specifically web-based instruction.

In any event, we as educators are very fortunate indeed to be involved on the “cutting edge” of a distance learning evolution and revolution! What an exciting opportunity for each of us to participate in the development and establishment of a new paradigm ideally suited to this new and ever changing technology as well as meeting the needs of the student and society. What an exciting time to be involved in the educational process and in the future development of intellectual stimulation, inquiry, and argument using advanced technology!

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INFORMATION AND COMMUNICATION TECHNOLOGIES AS A TOOL FOR IMPROVING TEACHING IN MULTIGRADE SCHOOLS

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1. Introduction: Multigrade schools in the Aegean islands

The Aegean islands are specific cases of social and economic development. Situated in the central and south part of the Aegean Archipelago, they face geographical isolation. They are at a distance from the mainland and from each other. Many of them are small, with low population density and most of them face serious communication problems. In almost all of them one can find strong work ethics, environmental quality and high community spirit.

In such communities, the school plays a vital role. If it stops operating, the island's youth has to search for education elsewhere; if it leaves, it is uncertain whether it will ever return to stay in its birthplace. Under such circumstances, the school's operation becomes an important factor for the island's sustainable survival [4].

The small size of the relevant parameters in relation to the need for the continuation of operation of the school in these areas makes multigrade teaching still a realistic approach for schooling, persisting to provide education of acceptable standards at the beginning of the 21st century [1], [2].

Multigrade teaching occurs within a graded system of education when a single class contains two or more student grade levels. They can be found in great numbers in the developing world and in relatively small numbers in the remote areas of the developed countries due to scarcity of pupils, teachers and/or resources. In the 1960s and 1970s, "open education" and individualized instruction became influential curriculum and instructional models. Such models were commonly implemented with multigrade classrooms [3]. Multigrade schools are referred to variously in the literature as "multilevel", "multiple class", "composite class", "vertical group", "combined class", "one-teacher schools", and "unitary schools" [2].

In Greece, multigrade schools (found in small islands and remote mountainous villages) are small with a low number of pupils and include up to six grades in a classroom. The teacher works on the basis of the approved curriculum for each class, and during the time that she/he teaches one grade, occupies the rest of the children in other activities. If possible, some class activities may be conducted with children of more than one grade. In general the philosophy of multigrade schools is based on optimisation of personnel and time. This optimisation makes the operation of multigrade schools the only viable solution in the cases of remote and isolated areas.

Problems In spite of such an important role, multigrade schools are very difficult to operate. Multigrade schoolteachers, who many times are young and inexperienced, have to meet the educational needs of different grades and this means multiple efforts. They do not have other colleagues to exchange views and to give solutions to pedagogical or administrative since most likely are isolated.

The pupils also feel isolated. The school is not for them the simulation of a challenging, competitive society. They do not have the opportunity to be influenced by many teachers and there is a feeling of getting less education from these schools that are different from the "normal" ones.

Yet from experimental studies assessing academic achievement in single grade and multigrade classrooms it was found that there is not significant difference between them. The data clearly support the multigrade classroom as a viable and equally effective organisation alternative to single grade instruction [3].

2. Information technology in multigrade schools

The introduction of Information Technology (IT) in any field of social and economic life promises revolutionary changes. These are of specific importance for small, remote and geographically isolated

areas. Provided that some basic infrastructure and a minimum experience are available, IT offers anyone equal accessibility to information, irrespective of the size of the place one lives, the geographical characteristics and the distance from the centre.

Education could not be exception to such a technological development. IT provides tools that help the school's operation; it is a new instrument that makes teaching more effective and more stimulating; and through some specific applications, such as distance learning, it brings a complete reform to the learning process.

While important for any school, IT promises an increase in the quality of knowledge acquisition in multigrade schools. Through a proper organization and support, multigrade schools can benefit from IT, becoming more efficient and competent.

The ways by which this is done have been examined in a pilot program whose task was to introduce IT applications to schools of the Aegean, containing a relatively large percentage of multigrade schools. This program named SXEDIA (in Greek means raft) and involves the installation of computers in 44 schools in 32 islands of the Aegean Sea [5]. It also involves the connection of the schools to Internet, teacher training, work with educational software, development of web pages to represent the schools and help them communicate and distance learning from the University of the Aegean in Rhodes. The kind of schools involved are given in Table 1 below:

Table 1

Schools	No of Schools	Average pupils per teacher
1-grade*	10	8.3
2-grade	11	10.8
3-grade	9	9.2
4-grade	1	8.0
6-grade	13	11.6

* It means that the only teacher could have to teach up to six grades in a classroom!

3. Information Technology applications in the SXEDIA multigrade schools

In Greek multigrade schools, a teacher can choose to apply one of the following teaching methods:

- Holding activities
- Staggered start.

According to the former, the teacher starts by teaching pupils of one grade. Meanwhile, the rest of the children are occupied with simple and enjoyable tasks that do not need the teacher's direct involvement. When teaching is completed, the pupils of that grade interchange places with pupils of another grade and the teacher starts teaching the new grade in the same way.

According to the latter, the teacher begins by teaching the pupils of one grade, motivating participation in some self- learning activities. Then, while the first group's pupils are busy working in such activities, the teacher begins working with another group. In this way, in one hour, the teacher activates in parallel more than one grade. It should be noted that it helps if the topics taught in parallel to different grades are from the same subject, but this is not necessary.

Holding Activities and Staggered Start have many common characteristics and can be considered equally efficient. Due to syllabi restrictions, other techniques, such as Differentiated Direct Teaching, are not applied.

Availability of IT infrastructure in multigrade schools and familiarity of teachers and pupils in the use of computers offer a unique opportunity for improving quality of multigrade teaching methods. Computers, in their role as educational instruments, favour time sharing between different groups of pupils, promote self learning activities and help controlling the degree of teacher- pupil contact. Consequently they offer a means for upgrading parallel session teaching methods and for providing high educational standards.

Given the time table requirements, the teaching methodology limitations and the electronic equipment available, there are three major facilities by which IT may improve efficiency in multigrade schools:

- Conventional IT applications included to a standard personal computer system
- Educational software
- Internet and communication programs

4. Conventional IT applications included to the computer (usually MS Office suite)

One of the popular activities in primary schools is that the teacher prepares and provides to the pupils specific educational material, adapted to each grade's average efficiency standards. This material usually contains:

- Exercises on a subject taught which the pupils are asked to answer
- Motivation for learning or practicing on a specific subject (e.g. drawing).

While important for any school, such an educational material is highly valuable specifically for multigrade schools. Here this material becomes the basic means that helps occupying pupils of one grade while the teacher is working with another grade.

However, it is easily understood that for a teacher of a multigrade school, a well prepared educational material of this kind, is time consuming and tedious and requires multiple effort compared to the effort required by a teacher in a monograde school.

The solution was to compile and make electronically available a database containing the relevant work produced by many teachers. These teachers offered willingly their activities written in paper and these became the input for the database. By adopting a simple method for the organization and classification of this material (using criteria such as the instructive unit, the grade and the degree of difficulty) this database became an easily handled instrument that helps the teacher to make the choice that fits each grade's needs. The exercises can be printed photocopied and handed to pupils to work on. Alternatively, it is possible for the pupils to give the answer to the exercises electronically, practicing their skills in Word Processors, electronic drawing or simple calculations in a Spreadsheet.

The database, created in this way, and its application for occupying constructively pupils, proved to be a useful educational tool for teachers of multigrade schools. It is simple, easily accessible and requires only basic computer literacy. Since it contains products of teachers' work, it is tested in practice and it is adapted to meet the every day educational needs. The teacher can modify and alter anything on each text.

This area is subject to further development: The existing database is enriched continuously.

Also presentation programs are planned offering techniques that help the pupils to work on their own, to make revisions, to consolidate and finally to better understand a lesson. The need for such presentation programs is essential if one keeps in mind that the teacher in a multigrade school spends a limited time with each subject and cannot give the appropriate attention to each pupil. Moreover such programs promote the individualization of the curriculum, giving motives to the children to learn in their own pace, something that seems vital in the modern teaching methodology. This brings the discussion to the next step.

5. Educational software

In multigrade schools, the major problem of occupying some groups of children while the teacher works with one grade, can be confronted partially using commercially available educational software. This proves to be a good solution that can be applied with both teaching methods of multigrade schools. It

assumes the existence of a library consisting of carefully selected educational software that covers almost all the subjects taught to an elementary school.

The process of occupying children with educational software is the following:

While the teacher is working with one grade, children of other grades are asked to study a specific topic using educational software (usually in the form of CDs). The pupils may be asked either to be ready to answer some questions, or to present a written essay on the topic.

The main difference between this application and the one mentioned in previous paragraph is that the educational software usually not only contains more information on a subject (and not only some specific points and questions related to it), but also the presentation framework mentioned above and facilities as marking, timing etc.

Through the program SXEDIA the schools were provided with a set of CDs that cover a wide range of general or specific topics (such as encyclopaedias, Greek, English, mathematics, tutorials on the subjects of each grade's curriculum, educational games etc). The CDs are carefully selected on the basis of some criteria among which the most important are:

- Easiness of usage and navigation
- Good presentation of the content
- Close relationship of the contents to the curriculum approved by the Ministry of Education and Pedagogical Institute.

The wide variety of the existing educational software in the form of CDs facilitates the creation of a relevant library but imposes the need for the evaluation of the quality of the software. In the case of SXEDIA, the difficulties faced in this context were due to:

- The fact that a large number of "good" educational software is not available in Greek.
- The material in the CDs was not always in accordance to the formal curriculum of each grade.
- In many cases, there were no explicit information on the structure of the contents and the teacher had difficulties in knowing which part of the CD could be addressed to each grade. The supporting team at the University undertook the task of presenting it the web site this supplementary information.

In the case of the SXEDIA such educational material was used to cover subjects that otherwise would not be taught at all. Thus, in some multigrade schools, there was no teaching of English, arts or music from a specialist. The CD library gave the children the chance to get some elementary knowledge on these subjects, in their spare time, with limited instructions from their teacher.

Working with the above software, peer tutoring was a frequent phenomenon: pupils with more knowledge and older pupils served as "teachers" to other pupils within and across differing grade levels, guiding and helping "weaker" and younger pupils.

In this way, they also learn that the teacher is not the only source of knowledge.

An increasing number of educational CDs appear in the market and the relevant library for multigrade schools can be enriched periodically at low cost. It is within the intensions of the University's supporting team to produce specific educational software for multigrade schools.

6. Connection to the Internet and communication programs

Connection to the Internet and familiarization of teachers and pupils with its uses opens new horizons for learning. Thus:

The Internet can provide a practically unlimited amount of information on any topic, substituting other sources of references in many occasions. In the case of the islands provides the only source of reference. A lot of effort was put towards training the teachers to use it.

Further, it is a means for implementing distance learning. Distance education, through videoconference, took place repetitively to nearly all schools. It was used to deliver experimental teaching on subjects of the curriculum, for training in the use of software, helping solve simple hardware problems etc. Under certain circumstances such distance learning could be a great part of the answer to the problems of multigrade schools.

Finally, the Internet allows communication among schools, thus reducing isolation. The web site is a platform where teachers and students of small schools can exchange ideas, present problems and search for solutions. Teachers were trained and continuously encouraged to communicate with each other, contacting schools in different islands using e-mail, e-chat, or videoconference techniques.

The web is the area where they searched for support in technical (hardware and software) and administrative problems, and -most important- the area for educational dialogue. Various web sites act as a link between the teacher and the authorities (Ministry of Education, various administration offices and between the teacher and colleagues. It is easy to understand how important this is in the case of multigrade schools where teachers are isolated, many times inexperienced and receive little (if any) support and infrequent supervision.

For pupils, the Internet is an area where they can express their ideas and communicate. Communication between pupils from different schools is encouraged through contests and joined projects, thus promoting the development of the feeling that students belong to larger communities. To help towards the above a drawing contest and a composition contest took place last month with many entries from pupils from most schools.

It is expected that the Internet will improve quality of knowledge offered to multigrade schools and will lead to a spectacular reduction of isolation. At present however there are some problems, namely its low connection speed, its incomplete adaptation to the Greek language and the trust to the medium. The ongoing development of Internet and web applications is expected to diminish these disadvantages.

7. Conclusions

Multigrade Schools is a reality and a necessity in many developing and developed countries, especially in the remote and isolated areas.

Information and communication technologies offer a realistic and practical method of helping the teachers in these schools in many and diverse ways as described above. The results can be very spectacular and not only improve the level of teaching, but also reduce isolation of teachers and pupils.

Pupils can learn to cooperate in a more coordinated and pleasant way studying their subjects with the help of the computer or communicating through the Internet.

Distance education can be used to train the teachers and lecture the students the same. The Internet applications help the communication between the islands and the rest of the world a much-needed commodity.

The infrastructure needed is very simple and easy to get as known (telephone lines are available in every school and a very common personal computer is very cheap). What is difficult is teacher's training in IT, their conviction to incorporate some of their acquired knowledge in their way of teaching and possibly later the inclusion of such techniques in the curriculum.

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DISTANCE EDUCATION FOR THE FUTURE

IMPACTS OF TECHNOLOGY AND DEREGULATION

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Introduction

The transition from the industrial society into a network society (Castells, 1996) based on information and knowledge has put focus on life-long learning. Decision makers today see the continuous development of knowledge and competence in the population as a prerequisite for economic growth and welfare (Säljö, 2000). The deregulation of educational systems, the development of Internet technologies and the diffusion of Information and Communication Technology (ICT) in society have created a market for distance education (Robinson, 2000). This has increased the number of actors offering distance education (Söderlund, 2000a; 2000b). Decision makers in Sweden as well as in the rest of the EU regard distance education or rather the provision of learning opportunities on the World Wide Web (WWW) as a way to realise life-long and life-wide learning as well as a means to create new business opportunities. In the discourse on distance education, learning and the learner has come to focus during the 1990's, in Sweden this is reflected in official reports as well as in a growing number of publications and newspaper articles discussing learning, in connection with ICT (Söderlund, 2000b).

Development of Internet technologies and diffusion of Internet access

During the 1990's the multimedia capacity of computers and networks has increased as a result of developments in computer and network technology (Fluckiger, 1995). At present there is an ongoing diffusion of broadband communication technologies on the Internet. This together with the creation of a market for distance learning and the discourse on life-long learning have lead to an interest among developers of net-based communication technology for its application for learning. The good side of this is that new tools for distance learning have been developed, but on the "bad" side there is a risk that development becomes driven by technology and that educational perspectives are not given enough room in the development of these tools.

New Internet technologies are introduced at a fast rate. The technical development means that not only better tools for asynchronous communication but also new tools for rich synchronous communication over the Internet are produced. This opens for the possibility of an increased element of synchronous communication in distance education. – One example of such a tool is Marratech Pro. It was developed under the name of the mStar environment by the Center for Distance Spanning Technology at Luleå University of Technology (see Url's). It uses the multicast protocol on the Internet and integrates video, sound, white-board and web pages in one package. The synchronous sessions can also be recorded digitally and accessed asynchronously.

Recent development of mobile solutions built on radio- network technologies or on mobile telephony may lead to new tools for distance education where learners have a continuous access to learning materials independent of place. One example of this is the project "Mobilearn" where the Viktoria Institute in Gothenburg experiments with mobile learning (See Url:s).

Some of the newer applications demand greater bandwidth than older ones and today this is a limiting factor for their use. Experience from the project Norrbotten Direct also illustrates the need for a well functioning local infrastructure. The problem of bandwidth will probably be reduced over the next years as broadband networks are built in many countries and as the competence among network technicians in protocols as multicast increases.

A wide spread access to the Internet creates a market for Internet-based learning as the increasing number of companies offering E-learning to organisations and individuals indicates (Söderlund, 2001). To more traditional actors in distance education thus are challenged by competitors that work on a totally commercial basis. The fact that universities and schools – in Sweden there are examples of this in all

forms of schools from primary to upper secondary – use distance education as part of the curriculum adds to the multitude of forms for distance education.

Another important issue is the gradual change in ICT-competence in the population. A growing number of the younger generation in EU countries have gained this kind of competence at home. This is especially the case in Sweden and in the Nordic Countries but a similar development is likely to happen in other countries in the EU as well. Table 1 show access to computers and the Internet in Swedish homes in the year 2000.

Table 1: Household access to computers in Sweden year 2000 and percentage of people in different age groups with access to the Internet at home in Sweden, September 2000 (Source: SIK institute 2001).

Age group	16-19	20-24	25-34	35-44	45-54	55-64	Total
Computer access (%)	90	70	77	84	79	59	76
Internet access (%)	78	57	68	72	67	48	65

The table shows that 90 percent of people 16-19 years old have access to computers at home. What is most notable for the future is the high percentage of Internet access among people in the group 16-19 years old. If the access to Internet at work or during education is added 98 percent in this age group have access to Internet. This development has been noticeable in Swedish schools. One effect is that students are on more equal terms with teachers and sometimes even more competent when it comes to use of computers, computer software and the Internet. Teachers no longer have a monopoly on information and knowledge.

At the same time as the use of ICT in schools has been introduced in schools new methods for teaching and learning has come to use inspired by e.g. problem-based learning or other methods where students have more influence over their own learning. It has become more common that students work in group or individually with themes or projects, and have more responsibility for the their studies. Sehlberg (1999) indicates that this is important for the outcome of the learning process.

The increasing ICT competence, especially among younger generations may change the demands they people make on learning opportunities in the future. It will be more important that distance education is flexible enough to allow a high degree of freedom for students on when, where and what they study and that they have influence on the planning of courses.

A shift from distance education to distance learning?

The idea of life-long learning stands on two principles. One is that individual learning is a life-long process. The other that this learning is not only or mainly taking place in the context of formal education but in the working place and in everyday life as well. At the end of the 1960's, when the idea was introduced by UNESCO, life-long learning was thought of as an ongoing individual process that should increase the opportunities for learning for individuals as a means to reduce socio-economic differences in society. In the late 1980's the concept of life-long learning changed into a strategy for economic and technological development underpinned by arguments from human-capital theory and research on how demands on qualification in working-life had changed (Rubenson 1996). Swedish official documents from the late 1990's reflect both these concepts of life-long learning but with an overweight for the later concept (Söderlund, 2000a). Especially in the later half of the 1990's the term life-long and life-wide learning has been at the focus of the educational debate, at least in the Swedish discourse.

Life-long learning can be seen as an expression of an educational ideology and at the same time, as a principle for reform of the educational system where learning inside and outside working life is taken into account (Rubensson, 1996). Life-long learning as a principle for reform of the educational system is evident in a report from the Swedish National Agency of Education (Skolverket, 1999). Formal education in primary and secondary school should prepare for life-long learning. At the same time the perspective on learning is widened to informal learning in organisations and individuals learning on their free time. The distribution of responsibility for different phases in life-long learning between public and private

organisations and the individual is put under discussion. Of special interest is the stress put on the responsibility of the individual citizen. He or she is expected to enter into a continuous learning process in order to raise his or her competence and to show an increased flexibility in working life. At the same time greater demand on the flexibility and openness of the educational systems is made and this goes especially for distance education or distance learning which is seen as the primary tool to realise life-long learning.

A Swedish official report (SOU 1998:84) states that new groups of learners must be given access to education. Future distance learning is expected to be given in forms that makes it more open and flexible to the demands of learners and learning organisations. It will be used inside formal education at schools and universities as well as in working life and in informal settings in free time. Much of this will have the form of net-based learning. The contexts within which distance learning will take place will differ between homes, the working place or institutions of formal education. The committee also wants to support informal learning, studies that not aim to get an exam or to pass a test. The idea is that this should be done without other contacts with educators than a demand for a course by students and that much of the contents should be possible to apply directly in students jobs. As a result of the increasing importance given to life-long learning the process of learning itself has come to focus in distance education. This makes it natural to talk about a shift of interest from distance education to distance learning and maybe considering the growing importance of ICT we should talk about net-based learning or net-mediated learning.

The nature of technology

Technology can be regarded as a social construction. Different groups have different influence over the social construction of technology. Some are more significant than others. In the construction of a certain technology developers assumptions about users and the usage of the technology are built into the technology (Bijker et. al. 1997, Bijker 1997). Orlikowski (1992) uses the concepts of a developers mode and a users mode of technology. Another concept is the interpretive flexibility of technology. This applies to the degree that a given technology can be reinterpreted according to the culture, routines, norms, etc. in the context of the user mode.

In the example of an application or a platform for distance education developer's ideas of the nature of knowledge, of learning, of the learner and of the way the application or platform should be used are built into the product in the developers mode of technology. This may more or less fit with the actual needs of users in the user mode of technology. This means that most platforms are not neutral tools in relation to the ideas of learning, etc, that educators and users might have. A certain platform or application may give more or less room for adaptation to the needs, etc. of a organisation working with distance education. If it is flexible enough it may give room for a necessary reinterpretation according to the culture, routines, norms, etc. in the context of the user mode.

Research on distance learning

The development of the WWW during the last half of the 1990's has lead to the development of applications and platforms for distance learning. Much of this has had a strong technological component where new technologies for dissemination of information and for communication have been introduced. The development of new web-based applications and platforms for distance learning means that distance learning tends to become synonymous with net-based or net-mediated learning.

When it comes to research on learning in general there is still a debate of in what ways the increasing use of IT technology for learning influences the learning process (Säljö, 2001). As regards distance learning Holmberg (2000) sees a need for theory building as well as better knowledge about student learning. Söderström (2000) claims that there are no strong theories on distance learning where the impact of technology on learning has been taken into account. Thus the educational components behind applications and platforms for distance learning have built on experience from earlier distance education and educational theories developed in contexts where technology has not been a main concern. At the same time there is a risk that in the absence of strong theories that take the impact on learning of technology the development of tools for distance learning will tend to be too technology driven.

My own experience from the practice of teaching in distance education is that learners use different resources in their learning process. Some of these are the ones that are planned for and available in the course. But students also use resources in their close environment, the work place or the home. Added to this is the possibility to use computers and networks in other ways than the course planner has planned for. Another issue to be considered is how the environment where the learner is situated gives support to the learner.

Research on distance learning ought to take the development mode of applications and platforms into consideration as the outcome of this process has significance for the practice of distance education. This should be considered in the study of distance learning as it becomes more and more dependent on information and communication technology. It is also evident that theory building needs a perspective in which the totality of the learning process is taken into account.

Need of new knowledge

What is needed is a theoretical framework for distance learning that takes the new conditions for distance learning into account and has a holistic view of learning.

Carlgren (1999) claims that in today's discourse on learning the cognitive understanding of the learning process is being replaced by perspectives based on social psychology and anthropology. Learning is situated in different contexts and is seen as participation in different social practices of which formal education is but one example. In this perspective learning is not only a cognitive but also a social, cultural and emotional phenomenon.

In a such a socio-cultural perspective learning is seen as situated in a certain context and the cognitive processes as part of the context where learning is situated. The learner is seen as an active, competent individual who in his or her learning uses mental tools – for instance concepts – as well as artefacts together with the resources that the social interaction with other individuals represents (Resnick, et.al. 1997, Säljö, 2000).

For the development of systems for distance learning a socio-cultural theory of learning poses a challenge. Not least the idea of the situated and context bound learning. It directs focus on how learning in one context as for example net-based learning can be designed to have effect in another context - that of the work place. At the same time it underlines the importance of not neglecting the tools that are developed in support of learning. In a socio-cultural perspective on learning it is evident that learning form of the point of view of the learner is taking place within different contexts – of which the course is but one. The learner will take part of the course in the work place or at home engaging with activities planned by the course developer. But it is very likely that learning does not stop within this framework. Over time, the learner uses other resources available in his environment for his or her learning. Learning thus takes place within different contexts and it is spread over time and place in other ways than what we usually think of when we talk about distance learning. The consequence is that the learner will use resources from all these contexts in his learning. Not only the ones that the educator puts at his disposal. How and in what ways this works and how this influences the outcome of learning is something we know very little about. It is possible that a socio-cultural perspective on the research of distance learning may help us focus on this kind of aspects of the learning process.

Some implications for the future of distance learning

The ongoing discourse on life-long learning makes for a change of focus to the distance learner and his or her situation and needs. Today it may be more proper to talk about distance learning or even of net-based learning.

Distance learning has become more complex and it can be thought of from several perspectives – that of the distance education provider, the individual the learning group, the learning or that of the developers of new applications and platforms for distance learning. A fact that has to be taken into consideration by developers is that distance learning will be directed to learning organisations, or to individual learners, sometimes have the form of exclusive specially designed courses and sometimes have the form of mass education. This will make great demands on the flexibility of applications and platforms for distance

learning for the future. To this might be added that thanks to the use of Internet, there now is a world market for distance learning in which distance education organisations operate. This puts new stress on the organisations to both compete and cooperate with each other.

At the same time, the more intense focus on learning makes a shift to greater attention to the quality of the learning process and the needs of the learner necessary. The increasing competence to use computers and the Internet among younger generations may change the demands on learning opportunities. It will be important that distance education is flexible enough to allow a high degree of freedom for students on when, where and what they study.

Considering the increased importance of ICT in distance education and the ongoing change from traditional distance education to more of net-based learning there is a need of more and closer cooperation between the developers of technology and researchers in education building on modern theories of learning of which socio-cultural theories might be of special interest.

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- SIKÅ Institute: http://www.sika-institute.se/utgivning/arsbok_ikt.html
- Utbildning direct (Education Direct): http://www.cdt.luth.se/utbildning.direkt/info/reports/final_report.html – Only in Swedish.

Education Direct (Utbildning direct): <http://www.cdt.luth.se/education.direct/> From here a number of reports and papers can be found.

A presentation of the tools in Marratech Pro from it's development phase at CDT, as well as a view of how developers thought about its use in distance education can be found at:
<http://www.cdt.luth.se/~unicorn/talks/WebNet98/sld001.htm>

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GLOBALISATION AND HIGHER EDUCATION: DEVELOPMENT OF THE HIGH SKILLS TRAJECTORY

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Abstract

For the developed and economically pre-eminent nations to retain their superior position in the global economy, a supply of appropriately qualified personnel is required. Essentially, this means the development and retention or attraction of those with the necessary High Skills. This paper examines how a number of organisations are undertaking this goal through the key progenitor of modern globalisation - Information Computer Technology (ICT) - to accommodate the scale and location of the demand for high skills. As an example, business education is examined and it is shown how a triadic co-operation occurs between universities, corporate enterprises and e-learning companies to engage the high-skills trajectory.

Introduction

Globalisation is here and it hurts. Workers in the developed nations - crucially those involved in the activity of mass production - are finding their jobs taken by those in the less developed countries. This is not a description of a new phenomenon as Weber (1958) essentially predicted it in 1911. He saw nations partaking of comparative advantage with respect to their skills and resources. An agglomeration of firms would locate where labour was cheapest, even in less developed countries. Arcangeli (Humbert, 1996, p35) saw this as not taking place due to the key location factor of labour in the 'Fordist Era'. However, Klein (2000, pp202-204), cites the Free-Trade Zones, which can be seen as a modern realisation of Weber's prediction. They employ approximately 27 million workers in 70 countries. As an example she reports on the Philippines' Cavite Export Processing Zone which has 207 factories and 50,000 workers. The site is a massive 682 acres of walled-in industrial units located in the town of Rosario, which has a population of 60,000 (Klein, p202). These are mostly young women who earn a fraction of that paid to their Western counterparts and work long hours in poor conditions (Klein, pp204-205). Similarly, it is assumed that these factories can be quickly moved to the next location if wages should rise or a more attractive - essentially cheaper - workforce can be found elsewhere. .

Comparative versus Competitive

Thus, with respect to employment, a dichotomy of reward has arisen: Poorly paid workers, anchored to boring jobs in sweat-shop conditions, are the norm for the less-developed countries whereas highly paid workers are free to roam amongst interesting assignments in the developed nations. This notion can be seen to rest upon two concepts. For those poorly paid items in the less developed world, the key feature of their plight is the theory of comparative advantage. It is the realisation of Weber's idea - production has moved to those areas where the cost of labour is significantly cheaper. Thus, whereas those in these areas find themselves earning greater income than before, it is amongst conditions that are far inferior to that experienced by the displaced workforce in the developed countries - whose Western-based sensitivities appear angered by such. However, the highly paid workforce - unique to the developed nations - relies upon the theory of competitive advantage as espoused by Porter (1998) to provide their affluent lifestyle. Porter (1998, pp33-35), referring to the competitive advantage of nations, declares that firms - not nations - compete in international markets and he declares the industry as the basic unit of analysis. Furthermore, whereas globalisation usually is considered to imply that firms transcend nations, Porter (p19 & p30)) contends that this is not the case and the role of nations is vitally increased because of this development. Competitive advantage is seen as the way in which firms organise and perform discrete activities. Gaining competitive advantage is essentially undertaken from finding new ways to conduct these activities (Ibid, p41)

Demand for High Skills

Successful producers require high skills in the areas of engineering, design and marketing as well as attendant business skills and the overall expertise of supervision and management to bring it all together. Of course, this concept of high skills extends into areas of computer science, pure and applied science, medicine, law and other professions. All of these require the skills and knowledge that are provided by institutions of advanced learning - the purveyors of higher education and would comprise those that Robert Reich (1991, pp208-224) has identified as 'symbolic analysts'. Due to the knowledge-based nature of high skills, Reich (1991 p220) claims that 'designs, instructions, advice and visual and audio symbols' can be easily communicated around the world. This is made possible by world-wide communication and transportation technologies. If it's not possible to send a picture, sound or text then supersonic and other jets can offer eventual face to face meeting.

Hence, competition appears to develop amongst nations at the high-skill level. It might be appropriate for a developed nation to lose its low-skill component to a low-wage economy but to lose the high-skill element would leave it extremely impoverished. The inevitable result would be a slide into the ranks of the low-wage economy. Thus, Brown and Lauder (1996) see positional competition in terms of being able to outsmart competing nations in the global knowledge wars. It is absolute standards in a global context that counts as opposed to those at a purely national level.

The response. In the UK, there has been a swift response to this - even at a fairly regional level. The Welsh National Assembly took the lead with a policy document that considers reform of the post-16 educational system. An example of a policy response is that the 'National Council for Education and Training in Wales (CETW) be remitted, by the Assembly, to ensure that local, regional and national planning and delivery meets the skills needs of employers and individuals, drawing on Future Skills Wales (FSW) projects commissioned by the CETW, advice from employer groups or other employer-related surveys.' (ETAG, p9).

Similar demands for high skilled workers exist throughout the developed world. In the USA it is noted that skilled jobs now represent 85% of all jobs (Meister, 2000) which is contrast to 20% in 1950. This shortage is becoming increasingly evident in the burgeoning information technology industry (IT). Again, in the United States, in 1999 nearly 720,000 IT positions went unfilled. In Silicon Valley alone, it is estimated that the demand for high tech labour is about one third greater than the current high tech workforce that exists in the nation itself (Cappelli et al, 2000). In order to attempt to meet this demand, the number of H-1B visas granted by the US authorities for high tech workers has been raised from 115,000 to 195,000 (National Journal, 2000). Although this can be seen as a dramatic change in absolute terms it hardly appears as an appropriate response when the huge size of the skills gap is acknowledged

Similar responses have been made by the UK government . As reported by Education Travel (2000, p18) the UK government is relaxing its restrictions on work permits as a means of attracting high flyers who possess key skills to enter and work in Britain. In practice, this means that those students who have achieved qualifications representing high skills - usually defined as having acquired a postgraduate qualification, will now be issued with a work permit to enable them to fill existing job vacancies. The scheme will be run by the Department of Education and Employment which will undertake a two-pronged approach: A website to advertise for people with 'outstanding ability' and the extension of work permits from four to five years..

Polarisation of income. This struggle by the developed nations to stay on top is not without its problems. A disturbing feature arises in this aspect of absolute standards to the extent that the possessors of these skills and credentials are naturally able to trade them on a global scale. As seen by Reich (1991), the symbolic analysts are able to move away from national or local wage structures and raise their earning power. As mentioned by Brown (2000), quoting Murnane and Levy (1993), for those left without the credentials to compete in the global market, stagnation or decline in their incomes is inevitable. Income inequality is accelerated. The concept of an individual - devoid of company based loyalties - presenting a portfolio of skills to the marketplace is an idea developed by Handy(1989) and further emphasised by Peters (1997). Peters suggests that these new 'portfolio' workers should market themselves as a 'Brand Called You' (Peters, p24), a concept devoid of any orientation to one organisation or nation state.

The Higher Education Industry

For those who aspire to join this world of symbolic analysts or portfolio workers, there does exist an industrial sector to provide them with the necessary qualifications. This is the higher education sector, which includes those organisations of university, or comparable status as well as the few specialist colleges that provide accesses to professional qualifications in Law and Accountancy. More importantly, it relates to graduate schools within those organisations that can provide the necessary teaching and learning to acquire those skills deemed to be of a recognisably high level. In the US alone, the demand for higher education by overseas students is huge. Approximately 500,000 foreign students are currently studying in the US. Furthermore, as claimed by Moe and Blodgett (2000, p189), it is expected that by 2025, the global demand for higher education will reach 160 million students.

High skills in leadership and business. One of the most prominent qualifications in the area of business education is the Master of Business Administration degree (MBA). It is a degree that possesses international currency and as the fastest growing postgraduate qualification in the world is seen as the most prominent generator of revenue for the universities concerned (Dearlove, The Times MBA supplement, 1999, p3). It was originally set up at the Wharton Business School at the University of Pennsylvania but is now offered by most of the Business Schools in the developed world. Whereas it has always been a prominent product amongst the elite universities in the United States, it is only recently that the two top universities in the UK - Cambridge and Oxford - have established Business Schools and offered the MBA product. A final concession to the academic viability of the degree and its revenue generating power. The MBA is recognised as the product that provides the necessary high skills to those who would wish to undertake a management role in business. It is a product for which there exists an increasing demand as mentioned by Business Week (1998), employers are willing to pay an increasing amount and those who graduate from the top schools expect to double their salaries.

Internationalisation of the product. The MBA is also an international product to the extent that the most popular medium of instruction for the degree is English. Increasingly English is seen as the lingua franca of the international business world and all but a few European schools make a point of using English as the medium of instruction. However, opportunities do exist to learn the language of the host nation. This is particularly encouraged by many European schools such as the Netherlands Business School at Nijenrode University (Independent, MBA supplement, 1998, pp8-9). Also, national schools make a great effort to attract overseas students and provide an international faculty. As reported by the editor of the MBA Career Guide, US schools have reduced the number of American students to no more than 75% and all have invested in increasing the number of international faculty (The Times, MBA review, 1999, p2). Stuart Crainer (ibid, p2), also mentions the advances in salary that can be obtained by those with an MBA from a prestigious school. The average starting salary for London Business School graduates was £54,695; £52,000 for those graduating from Madrid's Instituto de Empresa and £40,000 for those from Imperial College. In the United States, these starting salaries are significantly higher. For Harvard, perhaps considered the doyen of Business Schools, the average is £90,000 with Stanford at £85,000 and Wharton attaining £77,000. Crainer (1999) also puts these figures in context when showing Harvard's average pre MBA salary as £37,000, Stanford at £34,000 and Wharton as £31,000. Essentially, more than a doubling of pre MBA salaries has taken place.

These figures indicate the success and demand for this product, which is tailored to those individuals who possess considerable fluency in the lingua franca of business as well as at least one other language. Thus, they are able to move their skills around the developed world having been taught amongst an internationally composed student body by faculty who comes from various international locations. A product representing high skills which places the holder of the qualification in the position of being able to transfer employability to and amongst various locations and organisations in the developed world. As mentioned by Bernadette Conraths, the director-general of the European Foundation for Management Development in Brussels (The Times MBA supplement, 1999, p10) - 'The reason that UK schools do so well is that operating in English they can access the world'. This is a sentiment that would equally apply, amongst others, to those schools in the US, Australia, Canada and New Zealand.

The nature of the MBA product can be particularly seen as belonging to the high skills category when the nature of those applying for such a degree is noted. Most applicants to the leading business schools are holders of senior positions with their companies with up to ten years practical business experience. As

shown in Appendix A, most of the visitors to recent MBA fairs conducted at various capital cities throughout the world were professional people as opposed to students. A prima facie case for assuming that such people are in the market for upgrading or advancing their skills. Also, while most people at the fairs tend to be domestic residents of that state, a significant amount are not - perhaps indicating that this sizeable minority are the highly mobile possessors of high skills who wish to enhance or update. Similarly, a considerable number from these cities had undertaken the GMAT test, which is seen as an entry requirement to the top business schools - where a high-level score is required.

Changing role of the Business School

Lack of flexibility in universities. Successful holders of the MBA degree from the top universities can be seen as typical examples of Reich's symbolic analysts and strong contenders for the role of portfolio workers as described by Handy and Peters. In attempting to meet these high skills most universities suffer from a particular deficiency. Once validated, it is somewhat difficult to change the content of the curriculum and the way in which it is presented. There is as much resistance to change from the faculty as from the university administration. As explained by Barry Kenny, chief executive of the Irish Management Institute (Time, 2001, MBA report) 'you don't find the flexibility you need to move fast or change. You have to stand up at board meetings and convince historians and professors of medieval French literature that the school needs to change'.

Skills over knowledge. Equally, when talking about skills, most MBA programmes are anchored in the past. As stated by Professor Abby Ghobadian of Middlesex University Business School (Independent, MBA supplement, 1998, p7), MBAs are still taught to run old-fashioned organisations. These organisations were elevated, hierarchical, functional, bureaucratic and system driven. As such, they sought to employ personnel who did not question the traditional way of doing things. According to Ghobadian, today's organisations require managers who can manage and lead change. Thus, emphasis is placed as much on skills as knowledge. Case studies and live consultancy projects are means of indicating and developing these skills. However, a key feature of skills is that their nature and implementation can quickly change. It is estimated that 50% of all employees' skills will become outdated within 3 to 5 years. To cope with this, US corporate training budgets have increased by 23.5% between 1994 and 1999 (Report of the Web-Based Education Commission to the President and the Congress of the United States, 2000, p8).

Employability. UK authorities are particularly concerned with employability after graduation and have authorised the universities funding body - Higher Education Funding Council - to become involved in this area. The Higher Education Funding Council for Wales (Graduate Employability Audit, 1999) recently conducted an audit amongst institutions of Higher Learning in Wales to assess how they were bringing the feature of employability in to their degree programmes. Amongst their recommendations was to determine a clear specification of the skills required by a range of employers and the development of a clear action plan to specify how strategy on employability is to be achieved (Ibid, p2)

Branding the product. It is natural to assume that those who seek these high skills - or updating of those that they already hold - would become increasingly choosy and particular as to their choice of provider. Universities attempt to keep ahead of the game by branding their products. This is done through the use of star faculty and also through centres of excellence where aspects of thought leadership are packaged and disseminated. This is an area where consultants also operate and increasingly rely on the star faculty at universities to assist in their development of thought leadership. There is an irony in this to the extent that those universities that find themselves forging a brand name can only achieve it through the use of faculty members who themselves are increasingly resorting to Tom Peters' notion of the 'Brand is You' (Peters, 1997). These star performers are classic symbolic analysts. They work for the university, undertake internationally based consultancy projects for governments and private organisations, lend their services to international consultants and also - an increasingly fractious issue - write teaching programmes for private organisations at extremely attractive rates (Time, Executive Education Report, 2001).

Universities also, foster their brand image through accreditation. In this case, the elite UK schools have their MBA programmes accredited by the Association of MBAs (AMBA). Also on offer is the European Quality Improvement System (EQUIS), which offers a more general accreditation to Business Schools as opposed to the MBA programme. Most top UK and European schools have applied for this accreditation.

A new contender is the American Association of Collegiate schools of Business (AACSB). In the UK, only Warwick business school has applied for this based on the premise expressed by their dean that 'the status of various kitemarks varies throughout the world, which makes multiple accreditation important' (The Times MBA supplement, 1999, p5).

Need for practitioners. Because business schools are teaching practical skills to aspiring or actual business leaders there are some qualms as to the ability of academics to provide what is needed. Dearlove (The Times MBA supplement, 1999, p3) quotes the director of the School of Management and Business at Aberystwyth as stating that an 'MBA faculty will be a mixture of research academics and practitioners. The latter group will make up the majority of MBA teachers.' These practitioners can only be drawn from existing organisations or consultancy groups and undeniably will cause some difficulty in hiring onto a programme in the time-honoured fashion of a part-time contract. More is needed. A number of prominent organisations have developed their own 'universities'. Known as corporate universities, they are relatively common in the US but not so in the UK and Europe. They can have a number of forms to the extent that they are simply a renaming of the companies training department, partnerships with universities and other training providers, undertaking an innovative and unique approach to education such that they withdraw from involvement with other organisations. These can similarly be offered in combination. In the UK, this kind of panorama of activity is represented by a number of successful universities such as Unipart U, British Aerospace Virtual University, British Airways Engineering programme and Cable and Wireless College.

Forging alliances. Many corporate universities have alliances with traditional universities as quoted in the Business of Borderless Education Report (2000, p16) a recent survey reported that sixty two percent of corporate universities were already in partnership with traditional universities. This figure was expected to rise to 85% by 2003. What this alliance does is attempt to address the deficiency expressed by some business schools that more practitioners are needed to teach the high skills. Undeniably, the possessors of such skills are found in large and successful organisations and this kind of relationship is able to draw upon that kind of experience. For the corporate universities there is the opportunity to be able to offer a degree - accredited by their university partner. In a recent survey (PREST, 1998), 53% of responding institutions said that they offered masters courses specifically designed to meet the needs of a firm or group of firms. The UK branch of the Ford Motor Company is in partnership with over ten UK universities and Henley Management College has developed a virtual business school with the management consultancy firm Ernst and Young (Borderless Education Report, p16).

International partners. A further move to gain wider expertise and also transcend national borders is the alliance between Lancaster University in the UK, Hitotsubashi University in Japan, Indian Institute of management in Bangalore, INSEAD in France and McGill University in Canada. Together they offer an International Masters Programme in Practising management for mid-career managers who are being groomed for senior positions. Another development is the move by Cisco Systems in the US to establish the Cisco Networking Academy, in league with various educational institutions, as a means of recruiting suitable staff to make up for this deficiency in the high-tech area. This scheme has now spread to the UK and the rest of Europe.

Thus, the first feature of the move towards providing a high skills trajectory is the co-operation between universities and their counterparts in other nations and also between them and large corporations and consulting firms.

E-learning companies

Phoenix U. Another large sector that has recently arisen is that of e-learning companies. These are companies that offer executive education and specialised courses on line. They are the key warriors in the move to make education a global commodity. The first organisation to establish itself as a primarily distance learning organisation - and thus a considerable threat to the traditional universities - is the now legendary University of Phoenix. This offers a range of programmes from associate degrees to a doctoral programme. They can be taken by a mixture of online, distance and face to face methods. The university sees the working adult as its main customer, as does a challenger for its market, NYU online inc. This organisation is a for profit arm of New York University's School for Continuing and professional studies. As quoted in Fortune (1999, p5) amongst others it offers more than 2000 courses in management,

communications, financial services, information technology. It is targeted at those individuals interested in continuing professional development.

Scale and location of the market. Many firms are springing up in the US and other areas of the developed world, which are purely commercial with no ties to established universities. Due to the globalised nature of executive education - the demand for high skills in business - the key features of location and scale have to be recognised. As reported by Time (Executive Education Report, 2001) IBM alone needs to teach 30,000 employees in various international locations. Traditional universities cannot cope with this. Moe and Blodgett (2000, p229) estimate that the US corporate E-learning market is estimated at \$1.1 billion and is expected to grow to \$11.4 billion by 2003. Similarly, the global market for e-learning is estimated at \$300 billion and is expected to grow to \$365 billion by 2003 (ibid, p229). However, the e-learning companies can access this market and accommodate its needs. The knowledge enterprise sector is well funded with venture capital of £3 billion since January 1999 in the United States (Ibid, p4).

Triadic Co-operation

Thus, it can be seen that to supply the needs of the perceived global market with respect to high skills, new relationships have to be formed. Essentially, three distinct groups have to come together to reach the scale and location of the global market. One group is the universities who can stand alone but are increasingly seeking partners among their counterparts at home and overseas. They provide accredited degrees and the acknowledged reputation and skills of experienced academics. Another group is the e-learning companies. Critically, they provide the hardware and software that allows access to the diversely located market and the means to cope with its considerable size. Finally, there are the large corporations and consulting groups who besides providing an easily identifiable market also offer high-skill expertise in the shape of their senior staff. A pool of people on the ever-moving cutting edge.

In the UK, an example of such co-operation is the development of the Learning Lab. This is a partnership between government and various information technology companies such as ICL and Microsoft with a number of media companies - including BT and Websters International Publishers. Public bodies are also involved and the one university in the partnership is the University of Wolverhampton. It is at this university that the project is based. As mentioned in the Business of Borderless Education (2000, p27), it 'aims to provide a collaborative environment where partners from different industries can share resources and experience to create innovative learning solutions that address the real needs of individuals and organisations'.

Various examples exist in the US including the Open University, which has brought greater use of new technology than exists at its UK base to this venture. It has forged an alliance with both Florida State and California State Universities (Ibid, pp28-30). It operates under the name of United States Open University.

Further international co-operation is shown by the alliance between the London School of Economics and Unext.com. Unext.com co-ordinates a consortium involving various US private universities such as Stanford, Carnegie Mellon and Columbia University. Heriot Watt University is also involved as an experienced provider of international distance learning (Ibid, pp31-32). Unext.com is a private internet education company. The market for this venture is seen as working adults and corporations. Initially, this will be in the US but will eventually occupy the global stage (Ibid, pp31-32).

The business consulting firm, Arthur D Little has also entered the corporate university field with its school of management. It offers accredited degrees and has formed an alliance with the Carroll School of Management at Boston College (Ibid, pp56-57). Numerous other examples of the triadic type exist in the US as well as in Australia and continental Europe.

Conclusion

This paper has looked at the means by which the globally placed demand for high skills is being met in the business and executive education sector. To cope with the nature of scale and location and the fact that the skills themselves have to be developed, updated and changed on an ongoing basis, new liaisons have taken place. The domestically situated university with primarily face-to-face instruction is rapidly

becoming a model of the past. In its place has arisen the notion of triadic co-operation - groups of universities, e-learning companies and large corporations. These are the means by which the trajectory of high skills is achieved in the global marketplace to meet the needs of the developed nations.

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Appendix A

Data relating to visitors at World MBA Tour 2001

City	#'s attending	Professional	Student	Domestic	Overseas	GMAT takers
London	1,400	90%	10%	55%	45%	1,800 (UK)
Paris	1,450	84%	16%	68%	32%	1,899(France)
Manchester	240	67%	33%	72%	28%	1,800 (UK)
Madrid	877	75%	25%	57%	43%	724 (Spain)
Milan	457	84%	16%	81%	19%	703 (Italy)
Frankfurt	704	86%	14%	65%	35%	1,806 (Germany)
Warsaw	542	86%	14%	80%	20%	232 (Poland)
Moscow	1,516	91%	19%	81%	19%	1,374 (Russia)
Istanbul	1,487	80%	10%	89%	11%	1,765 (Turkey)
Mexico City	540	93%	7%	92%	8%	1,602 (Mexico)
Buenos Aires	310	92%	8%	88%	12%	567 (Argentina)
Sao Paulo	971	85%	15%	92%	8%	1,783 (Brazil)
New York	1,260	84%	16%	76%	24%	11,471
Sydney	280	74%	26%	55%	45%	562 (Australia)
Shangai	510	89%	11%	82%	19%	6,260 (China)
Hong Kong	460	87%	13%	40%	60%	2,492
New Delhi	1,450	84%	16%	92%	8%	6,123 (India)

Source: World MBA Tour 2001 - MBA Career Guide

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ADVANCES IN VOCATIONAL TRAINING AND INFORMATION TECHNOLOGY TO IMPROVE THE LACK OF IT EXPERTS

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Introduction

The lack of skilled employees in the sector of information and telecommunication technology (IT) is an increasing barrier to economic development and trade. Not only the IT branch itself is affected by the scarceness of qualified IT employees but also the other primary markets. To face the rapid changes within a global competition, planning, implementing and maintenance of state-of-the-art technologies for electronic commerce and trade requests qualified IT specialists everywhere.

In the past, most IT experts were recruited from universities and colleges. However, the number of these highly qualified graduates has been too small to satisfy the manpower requirements of many companies. Other employees have been factory-trained to meet their tasks within the industrial processes. However, indoor or outdoor training programs are expensive and not always very effective since knowledge gained in training courses and seminars is not easily to be transferred [14]. Furthermore, since the requirements of information technology are changing rapidly, a sound knowledge base is needed to cope in the long run. How can vocational training contribute to solve these problems ?

The German Structure for Vocational Training in the IT Branch

In Germany, almost 40.000 apprentices will become basically qualified to IT professions during the next years. In order to offer these employees a wide scope of career development, advanced vocational training measures are needed. Therefore, an alliance of the national federation of employers and the trade unions ('Bündnis für Arbeit') have initiated a new structure for advanced vocational training in the IT branch.

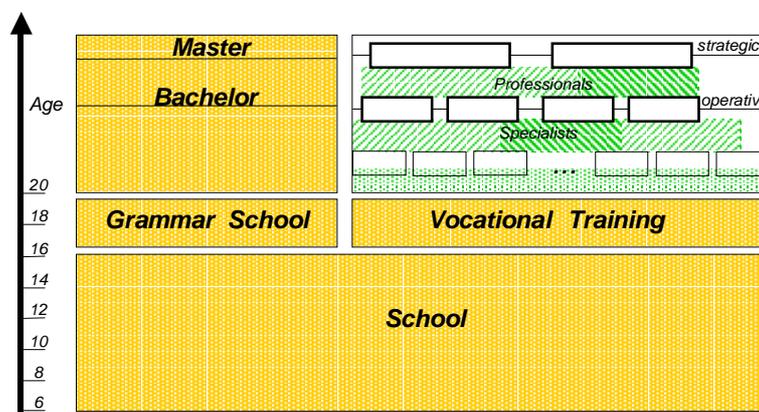


Figure 1: Structure of the IT Educational System

In this structure devised by the “Federal Institute of Vocational Training” (*Ger: BIBB*) and IT-experts around 30 professional profiles on three levels are defined: specialists, e.g. network administrators, operative professionals and one business and one technical oriented strategic professional profile. While doing so, several qualification profiles are each summed up and merged with the respective higher level. Degrees on the level of the operative professionals are thought to be comparable with a bachelor degree, strategic professionals have a qualification similar to a Master degree (figure 1).

The Fraunhofer Institute for Software and Systems Engineering (ISST) has been commissioned by the German federal ministry for education and research (BMBF) to develop a concept for translating this structure into practice. Fraunhofer ISST is one of the leading german research organisations developing and establishing new concepts for advanced vocational training in the domain of IT technology [8]. Our interdisciplinary working party consists of professionals in the fields of computer science, educational

science, communication and commerce. We cooperate with ‘global players’ (German Telekom, Oracle a.o.), as well as with young start-up companies and providers of vocational training courses.

To improve the shortage of manpower we currently work on the following research projects:

- APO¹ (= ArbeitsProzessOrientierte Weiterbildung - “Workflow-Embedded Vocational Training”) The aim of this project is to develop and establish new ways of vocational training for the information and telecommunication sector. We elaborate curricular and instructional guidelines that combine learning and working processes to assist companies to transfer the concept to their plants and offices. A collaborative workspace is provided to use electronic media and to support learning processes.
- Teachware on Demand² provides tools and the technical infrastructure to efficiently develop up-to-date, modular organized instructional material.
- mecomp.net³ provides an internet portal for firms and employees to permanently keep track of actual requirements and opportunities of IT-skills and serves as an intelligent ‘expert broker’.

In this paper we will focus on APO and Teachware on Demand, for further information about mecomp.net see [12].

APO – an approach to integrate learning and work

The goal of the APO Project is to embed vocational training within the working process and understand individual learning efforts as part of a learning organisation [4, 1]. IT technicians will be trained *on-the-job* and *on-demand* in a *project-like manner*.

Within the working process, learning is always initiated when employees are confronted with new or difficult tasks. But those informal learning processes are happening unsystematically and ‘hidden’ [9, 10, 13]. In contrary, curricular vocational training measures are more structured and transparent, but they do not refer very well to the tasks and demands of the processes in labor [6].

The basement of our concept are so-called reference projects. They function as the missing link between curricular decisions to structure vocational training measures on the one hand and informal learning processes that are related to work related tasks on the other.

Reference projects derive from projects that had happened before in reality. They are abstracted and formally mirror the work flow of a vocation (e.g. the network administrator). Reference projects also specify typical tasks and situations of the occupational profile (e.g. *planning, installing, and maintaining a local area network*) as well as the necessary occupational qualifications. More volatile informations such as the actual knowledge base or working tools are specified, too being aware that they have to be updated and adjusted in regular cycles [5, 7]. Furthermore, curricular decisions are influenced by various threads such as

- An analysis of professional qualifications required by IT business companies
- Well elaborated occupational images within a career system for IT experts
- Theories and experiences in the field of curriculum development
- Learning theory, cognitive and motivational factors of information processing
- Theory and practice of human resources development
- Expertise in the organization of vocational training courses

¹ APO is funded by the German ministry of research and technology (bmb+f)

² Teachware on Demand is a co-operation of Fraunhofer ISST, GMD IPSI, Telekom AG and HTTC e.V. Teachware on Demand is funded by the German ministry of research and technology (bmb+f).

³ mecomp.net is a co-operation of Fraunhofer ISST and the Berlin University of Arts. mecomp.net is funded by the Senate of Berlin.

As far as possible, requirements for a particular occupational profile should be acquired directly on the job and in their entirety. The conversion of a reference project into learning processes will be a mutual task of participants and training supervisors. Referring to the curricular material, they will select tasks and duties within their company in which the participant will grow and develop in order to qualify extensively for a new vocational profile. The trainers' task is to coach and accompany the participant in his informal learning processes rather than teaching him detailed information. The guidance is very intensive at the beginning, but then it is gradually limited to the needs of the learner. This method is part of a basic approach thought to develop skills and oriented to the basic approach of "Cognitive Apprenticeship" [3].

Companies will be able to hand out nationwide accepted certifications to their participants and will be certificated themselves by an independent organisation to assure the quality of the vocational training measures.

Teachware on Demand

Even though instruction remains needed in APO oriented vocational training, conventional instructional resources like books, manuals and static web sites become more and more obsolete:

- contents are getting more unique and very specific; instructional resources to guide and support the learning process should be such as well
- learning environments are proprietary, many of the information needed to transfer knowledge from theory into practice is company-specific. Instructional resources that may faster this knowledge transfer must integrate domain specific and company specific „knowledge“.
- real-world problems must be solved within reasonable time; e.g. a network administrator must be able to reconfigure a router in short. Instructional resources that enable an IT technician to learn about router configuration on-the-job must be made available within hours or even minutes.

These requirements cause a demand for instructional resources that are highly adaptive, highly integrative and can be produced on-demand.

The aim of our project „Teachware on Demand“ is to develop infrastructures and tools for the on-demand generation of highly adaptable, highly integrative instructional resources.

The basic idea of the project is to divide existing resources (e.g. textbooks, manuals, slides) into small segments and to generate new resources from these segments (figure 2).

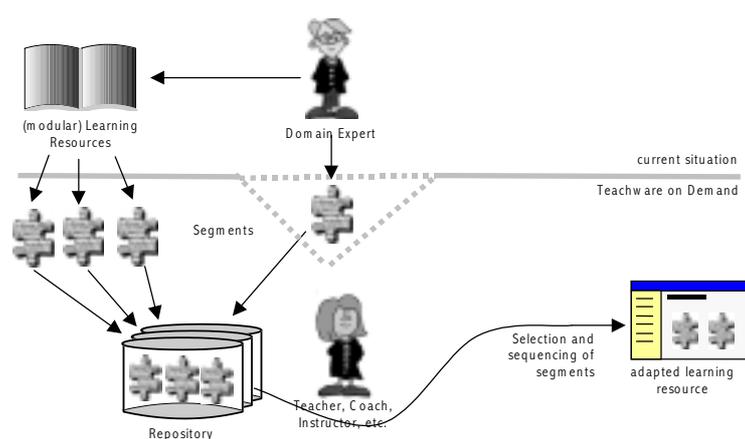


Figure 2 : Teachware on Demand Authoring Cycle

The whole process of selecting the most appropriate segments for a given problem and learner as well as the sequencing of the selected resources is automated in order to be able to

- handle even very large repositories of segments,

- generate new resources within a reasonable period of time,
- allow simultaneous searches in many repositories,
- use patterns for frequently used document structures and layouts.

To automate selection and sequencing of appropriate segments a very expressive set of metadata is needed. For this reason “Teachware on Demand” has extended the base metadata set of IEEE Learning Object Metadata [11] with an index that contains references to all concepts either required by a segment as prerequisite knowledge or provided by that segment as its taught knowledge. The index allows to set up a bipartite graph of concepts and segments that can be searched and restructured by means of - partly heuristic - graph algorithms [2]. All of these graph algorithms can be configured in order to support simple didactic rules, certain document structures or special use cases.

Summary

In order to solve the acute shortage of qualified personnel in the information and telecommunications sector over the medium-term, the German Federal Ministry for Education and Research (*Ger. BMBF*) has ordered the set-up of a Regulation Procedure for structuring the further education system. Parallel to this Procedure a project has been set up to develop and elaborate an innovative concept for further IT training. The fundament of the project’s concept is formed by so-called reference projects, which are derived from real practice projects (e.g. networking the German Reichstag). They are the basis for finding higher qualifications, which are then gathered and specified during the course of actual jobs carried out in the participant’s business.

By using web-based educational materials that can be adapted to the learner’s individual needs on demand a large amount of learning can be carried out almost entirely at the work place and in the real working environment.

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NET4NET – SWISS NATIONAL NETWORK FOR NEW EDUCATIONAL TECHNOLOGIES

Karin Wäfler net4net, Olivier Dinichert, net4net

Information and knowledge exchange is a must in the meshed world of the internet and the IT-age. Switzerland's government has recognised the sign of the time and has initiated last year several approved national networks to facilitate the know-how transfer between the universities and the enterprises. One of these networks is the Network for New Educational Technologies net4net.

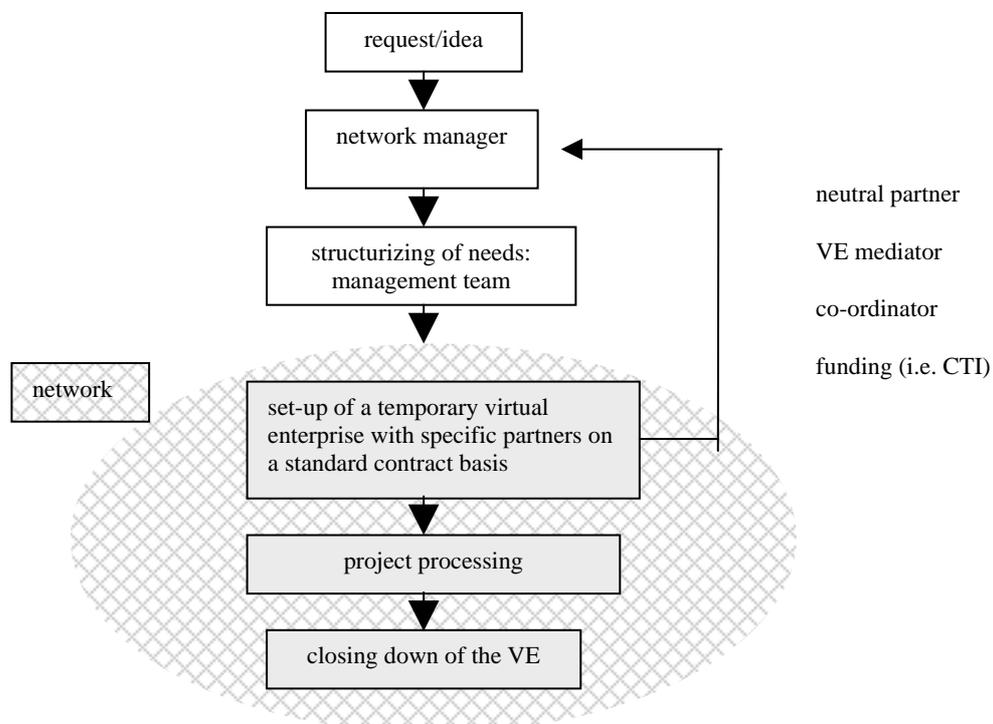
Definition

What exactly is the definition of net4net? Well, net4net is the national network for new educational technologies – it is a partnership for national and international institutions, enterprises and universities with specific skills in new learning technologies and for those firms and institutions which are interested in sharing knowledge and seeking to work with different national and international partners in investing and establishing various projects. It was funded in May, 2000 and is a new member of EDEN. Net4net is one of seven main criteria of the Swiss national network for Information and Communications Technologies Network ICTnet, initiated and acknowledged by the Federal Council.

Vision

The vision of net4net is, to function as a front gate inviting partners to present their requests to the world of new learning technologies.

How does net4net function?



Upon an external request of a customer or an idea from a network partner, the net4net management team forms a temporary virtual enterprise with specific partners, who have the needed knowhow, on a standard contract basis and proceeds to processing the project. The temporary virtual enterprise is cancelled once successful completion of the project is effected. The net4net is managed by the R&D-department of *eduswiss*, a partnership for postgraduate education in Berne, Switzerland.

What does net4net offer the target groups (i.e. firms and universities)?

How do target groups, such as firms profit from net4net? Indeed company partners receive mandates to engage in temporary virtual enterprises, PR and publicity, information of the latest standards such as SCORM etc., a quality label, IT-education as well as invitations and participation at various conferences, workshops and events (i.e. NETTIES 2001, 13th to 15th September 2001, University of Applied Sciences in Fribourg, Switzerland, www.netties.net). Universities are granted access to research and development projects such as

- referrals of project partners
- project co-ordination
- supporting project submission
- fundraising assistance
- managing projects
- scientific support
- project market
- to engage in conferences, workshops and events
- knowledge management
- co-operation with EDEN – European distance education network

Financing

Net4net is financed mainly through yearly contributions by the Bernese University of Applied Sciences and Western University of Applied Sciences in Switzerland and partner fees as well as a small percentage from project contribution and consulting and referrals of contacts.

Goals / Objective

The principal net4net objective is to implement IT-technologies to improve the learning processes at universities with the co-operation of partners in the scientific and economic fields. To foster training and continuous education in companies by using the latest standards and methods and to work closely with institutions, mostly by assisting them with implementing new developments and realising new methods.

net4net and Europe

Switzerland is not a member neither of the European Union nor of the European Economic Area, but Swiss institutions have nevertheless the possibility to participate in European research and education programs. This happens as a “silent partnership”, which differs in two main points from a normal participation: Swiss partners cannot act as a project promoter and their financial contribution is covered by Swiss Federal Office for Education and Science.

Quite a few Swiss institutions are very active and are constantly looking for European collaborators in various projects. They are willed to exchange knowledge and to participate in R&D-projects. Net4net considers itself as a competent partner for European projects, thanks to the network’s members which dispose over different competencies and know-how, especially in the field of e-learning and new educational technologies.

***Eduswiss* – a net4net member**

An important member of net4net, desiring to participate in European programs, represents *eduswiss*. *Eduswiss* is a virtual university for postgraduate studies in information and communication technologies, constituted as a partnership between universities, universities of applied sciences and enterprises. Over 120 modular courses are held all over Switzerland for university graduates in computer science, telecommunication, multimedia, environmental and general management.

Project “eduswiss online”

Several modular courses are already hold partially on a virtual level and *eduswiss*’ research and development team is constantly working on the didactical and technical semi-virtualisation of other modular courses and on the support of teachers and tutors. The project, supported by the Swiss Federal Office for Education and Science under the initiative “Swiss Virtual Campus”, includes a close collaboration with the lecturers and the students — particularly if technology has to meet their needs.

In a first step an e-learning hub (WebCT) has been installed to provide an online course-administration tool to lecturers willing to put their course contents on the web. In the frame of “eduswiss online” they are given support to use this template.

The emphasis of the project lies in setting up an advisory service for pedagogical and didactical queries. Relevant content will be managed through a knowledge database. Eventually this will end up in a “didactical handbook”. “Asynchronous support” for lecturers is provided by accessibility to this content, “synchronous support” will be done by telephone or face-to-face, i.e. consultation or workshops.

Project ec-room

Since 1996 several successful prototype courses within a virtual classroom based on the Swiss ISDN public network were realised. *Eduswiss* is building up a network of rooms with videoconference and multimedia equipment at Swiss universities of applied sciences, universities and the Swiss technical universities. The network facilitates synchronous, interactive, electronically mediated communication. The “e” stands for “electronic”, the “c” for “communication”, “collaboration” and “classroom”. That summarises the different using modes of the network.

Other members of net4net assume the realisation of projects: the Bernese University of Applied Sciences and several SME are highly interested to contribute to European projects with their experience and know-how.

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THE FIRST TEN YEARS OF DEVELOPMENT OF DISTANCE EDUCATION IN ROMANIA: 1991 - 2000

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Introduction – a history of initiative and growth on the background of no previous tradition

The story of the beginning of distance education in Romania has been an audacious and brave episode, based on the endeavour of few innovative entrepreneurs. The considerable range of needs of various Romanian target groups and the fast emergency of new social and economical sectors have endorsed an impressive development of distance education provision at vocational and university level. The issues of quality assurance and accreditation have nowadays become a serious matter of action and political will in Romania.

The development in Romania of the model “The Open University UK”: CODECS – a case of business success

Following a Phare TEMPUS project and the extensive support provided by the UK Know-How Fund, CODECS has been established in November 1993 as a limited company owned by the members of the first group of students, trained by the Open University Business School experts. Due to effective team working and a suitable response to the market requirements, CODECS capacity and network has grown extensively, covering at present the whole country. The power of the individual initiative and the offensive approach has generated a relevant progress, a case to be followed by the national education system.

The network of the Phare Open Distance Learning Study Centres – the academic potential put into service of the distance education development

Started by the Feasibility Study presented at Budapest in November 1993 – at the same date as the foundation of CODECS was registered - the Phare Pilot Project for Co-operation in Distance Education has created a national framework for determining the growth of open distance learning in Romania. The Office for Open Distance Learning, supported by the seven ODL centre managers, has drafted the most relevant regulation documents required for the establishment of distance education at university level. Training of ODL trainers, development of ODL courses and support materials, purchase of specialized library, emplacement of interactive equipment and communication infrastructure, sponsored by the European Commission, have adequately contributed to a resolute development of distance education in Romania.

The present action of the Commission of Accreditation of University Level Distance Learning has started a thorough process of quality assurance and control, for the benefit of progress of ODL.

The open distance learning – an effective tool of human resources development in the sector of social development in Romania

The broad range of social problems, from unemployment reduction to poverty alleviation, from child protection to ethnic minorities' discrimination, from rural areas development to health care has required energetic training delivery schemes to be quickly put into place. The civil society organisations became actors of knowledge dissemination through ODL and their interaction with universities created a fertile frame of innovatory training products and methods. Cases of best practice are described and their relevance for the prospective implementation of EU structural policies is analysed. The impact of ODL on the systems of continuing training of adults in Romania is assessed consequently.

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SIN-ENERGY OF *e*-LEARNING POSSIBILITIES ON THE WAY TO *e* -UNIVERSITIES IN LITHUANIA

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Introduction

“e-Europe is a roadmap to modernise our economy. At the same time, through its e-Learning component, it offers everyone, but particularly young people, the skills and tools they need to succeed in the new knowledge based economy”.

Romano Prodi
President of the European Commission, June 2000

Lithuania has been making significant progress in its efforts to reform its economy and society. There is wide spread agreement that the development of its human resources through the expansion and innovation of the education system using information technologies is a cornerstone for further economic and social transformation and the attainment of a primary economic policy goal of integration into the European Union. Within this context, the upgrading of the skills and knowledge is essential. The government and educational sector have determined that *e*-Learning has enormous potential to meet this challenge and significant policy groundwork has been laid for the development of an advanced and comprehensive *e*-Learning system.

e-Learning using ICT in higher education in the context of life long learning is one of the main research and development priorities in every country. Some of the countries already have a large higher education sector and well developed ICT infrastructure which has been continuously updated and where the main part of the citizens has access to the “network”. Other countries don’t have such possibilities yet and therefore the delivery of on-line learning is quite limited. Firstly it is important that every country, every government, institution, teacher / researcher has his/her own policy in life long learning and ICT employment. The encouragement of life long learning and the successful use of ICT in the learning process should expand all the time if its aimed on the ground of collaboration and dissemination of good practice.

The analysis of the development of educational reform, the emphasis on current problems, made with the help of concrete sociological research, allow a more effective substantiation of *e*-Learning system model in Lithuania and efforts for its implementation. During the complex research there should be prepared recommendations how *e*-Learning process must be organized and how distance courses should be delivered.

***e*-Learning possibilities using ICT in Higher Education**

Higher education institutions should also join, stimulate and recognize ICT based educational initiatives. Hopefully higher education institutions will participate actively in life long learning while employing modern ICT not only as a part of a context in various subjects/programmes but also for the dissemination of education and teaching. Moreover, it’s expected that higher education institutions would train future researchers and experts and act as mass training institutions.

The education itself became a quite important good and new technologies allow choosing a place for learning despite of time and pace.

Many of the tomorrow’s students will raise new requirements for higher education institutions:

- Students want to access the newest information and knowledge in any time and any place;
- Education must be cheap;
- Education must be learner oriented;
- Education must develop students’ learning skills (critical thinking, collaboration, etc.).

New technologies provide education institutions with a possibility to realize those needs. ICT have become a powerful instrument for higher education institutions, teachers, researchers and students – both full time and correspondent. Besides the improved accessibility of education and training, ICT could also improve the quality of education. Thus why it is so important that higher education institutions would pay a huge attention to the quality while creating ICT based education. Institutions should take more pains for the use of possibilities provided by new technologies – not only to ensure that education would become independent from time and place but also that the content would be provided in such ways that stimulate students' motivation. ICT enrich education with new methods. We mean learning not teaching. And as it was already mentioned, technology is for the satisfaction of requirements that aims are accomplished. In the learning process the technologies themselves should become an impulsive force.

Somebody thinks that new technologies will reform education still firstly there should be let down the bars before the ICT could be fully employed in the learning process.

As it was already mentioned the technology should be used in the promotion of education but not on the contrary. Still the experience shows that when the new technology is employed in education it also is being improved. Today in ICT based life long learning there can be used some kinds of technologies: internet, videoconferences, CD ROMs, television, etc. Those kinds of technologies can be employed separately or a few of them at the same time along with the additional traditional learning material or without it. Moreover, ICT based education could be performed during face-to-face meetings or in a combined way, that is organizing group meetings, face-to-face lectures, etc. Researches show how ICT based life long learning differs in different countries, different institutions, and even in separate study programmes.

As new technologies have been employed in education only recently there are not many researches analyzing how those technologies could be used for the improvement of education quality. So it is very important that higher education institutions would expand research activity about the use of ICT in education. Those researches must be spread widely along with good cases and the best practice.

The Objectives of *e*-Learning development in Lithuania

In Lithuania more purposeful care of *e*-Learning was taken only a few years ago. Although distance studies based on correspondence and short-term sessions have been existing in Lithuania since 1930, they lost the public trust at a certain extent a few decades ago and have not been modified since re-establishing independence in such a way that quality could be guaranteed. There are no established systems of qualified *e*-Learning organisers' training, advanced delivering and preparing teaching materials, programme participants support and programme accreditation. In 1996-1999 Multi-country PHARE Distance Education Programme for Central and Eastern Europe and Lithuanian investment Programme of Distance Education Development LietDM along with modernisation of LITNET created conditions for the development of a contemporary *e*-Learning system in Lithuania.

On one hand, we have to admit that the situation of *e*-Learning in Lithuania doesn't meet modern requirements despite the constant increase in demand for *e*-Learning studies every year. On the other hand, the initial works in creating contemporary Lithuanian *e*-Learning system gives the ground for hope that this area of education realistically can be modernised to meet the demand of the state, communities and individuals in short time as the society of information develops.

The status of correspondent education has never been high in Lithuania in relation to face-to face teaching, mainly because of a lower quality. Now a lot of university students have jobs beside their studies. Taking some *e*-Learning modulus at their convenient time could be a solution for them. Such flexibility of learning process would provide the students with opportunity to manage their time in the most effective way. Kaunas University of Technology is using the advanced computer technology and related opportunities while taking part in the *e*-Learning development project as well as is initiating new projects.

For the creation of *e*-Learning system we need to establish:

1. The system of training and professional development for organizers, lecturers, consultants and tutors of contemporary *e*-Learning programmes.

2. The system of encouragement for developing and re-establishing distance education programmes and formal *e-Learning* studies modules.
3. The system of quality evaluation and quality assurance for *e-Learning* programmes.
4. The support system for the participants of *e-Learning* programmes.
5. Developed computer network and other means of telecommunication adjusted to *e-Learning*.
6. Legal basis for *e-Learning*.
7. Effective funding mechanism for the *e-Learning* system.

The Attitude of Lithuanian Citizens towards *e-Learning*.

1548 inhabitants of towns and remote districts (not students), age from 18 to 60 years old (38 Distance Education experts) took part in the **survey** performed at Kaunas Regional Distance Education Study Centre at Kaunas University of Technology (2000).

They were asked:

1. if they wanted to study by distance education method;
2. if yes, what kind of knowledge they would like to acquire;
3. what would different age groups seek if studied in distance education;
4. if they know how to use information technologies, and what kind of them, etc.

The questionnaire was delivered in rural regions of Lithuania. There was also developed an electronic questionnaire for the questioning of educational experts (<http://distance.ktu.lt/anketa/> login: *anketa*, password: *ekspertas*). The data received from main group of respondents and from educational experts was analysed separately.

The analysis of empirical research data allows determining **the motivation of *e-Learning***. The respondents most often indicated that such learning is necessary for the job now, a little less – for the job in the future. 9 out of 10 respondents link open and distance learning with the job. Such motivation fully corresponds to the requirements of the society, as well as the objectives and aims of open and distance education.

It is necessary to emphasise that when younger respondents relate learning with the future, the respondents of mature age expect that learning will help them at present. People with higher education also expect that learning will help them in their work right now.

The research revealed the fact that a part of the respondents feel lack of confidence working with computer. The most often indicated reason for the lack of confidence is that they may not understand and may not learn new information. This reason was indicated by more than a half respondents lacking confidence. Every fourth respondent was afraid to spoil the technology. More than a half from those having secondary and not finished higher education (the majority still studying at University) indicated that they do not feel confidence while working with computer because of the possibility to misunderstand or fail to learn the new information. Half of the respondents with higher education thought so, while there was only one third of the respondents with not finished secondary education who supported this idea.

A big part of the research was dedicated to estimate life values. The respondents showed high evaluation for health, the ability to enjoy every day life, science, information society that would insure better perspectives for the mankind, as well as education. According to correlation coefficient, the importance of information society was especially emphasised by those working with computers, using the Internet and other new technologies.

The author determined prioritable life values with the help of factor analysis. The experts related the significance of information society to insure a better perspective of humanity with the significance of science. Thus this factor could be called the factor for the scientific basis for the information society. In the common array of all respondents, the significance of information society was selected in the separate

factor, but more in the relation with financial benefit and education. They evaluate the factor of information society as gained job and on that ground received pay due to the education

It is obvious that it is not possible to exclude a single factor of education. Education indicator is also included in the cultural orientation in the main array of experts, moreover in spirituality factor of experts. It's natural that for all people participating in the survey, including experts, education is not end in itself but a way to achieve other goals.

According to the factor analysis, there is distinguished factor of the importance of distance education in the main array of people participating in the survey. Experts mostly related distance education and possibilities for re-qualification, training of workers. People participating in the survey emphasized that education should continue during the whole man-life. As correlation factors show, respondents with secondary education emphasize that education system is conservative least. Respondents with higher education indicated the relation between education and future work most rarely. Respondents with higher education emphasized the importance of continuing education. Respondents with special secondary education emphasized the perspective of distance education less. People with higher education in particularly distinguished orientation towards the information society. Respondents with not yet finished secondary education emphasized the importance of learning despite of age less. Currently they are studying so the perspective of life-long learning doesn't seem so attractive as for those who have much higher level of education.

Residents from Kaunas, that is from cities where is the biggest amount of higher schools, mostly entitled education system as conservative. People from cities where are professional not higher schools indicated that education should be more related with concrete future work. A need for progressive teachers was more often emphasized by those and Kaunas residents. Respondents from Klaipeda and Siauliai, that is from cities where is only one higher school and from cities where are professional schools, are seeking for a wider application of distance education. Residents from Klaipeda and Siauliai underlined life-long learning. People participating in the survey from city or region with only a professional school emphasized the perspectives of distance education, the application of distance education to re-qualification and learning despite of age. Klaipeda and Siauliai residents more underlined the importance of education in the development of information society.

Both respondents and experts are underlining the importance of e-Learning. That is obvious as far as respondents perceived the merits provided by open and distance education while acquiring computer literacy skills. The attention of experts is obvious by itself as far as they are asserting the importance of open and distance education. Respondents more distinguish the merits and possibilities of distance education and life-long learning and experts more relate distance education and work, emphasize the orientation of education system towards the development of information society as well as new teaching forms and performers – teachers. It is obvious that while implementing education reform the most difficult thing is to prepare newly thinking teachers able to implement new teaching methods effectively while using ICT.

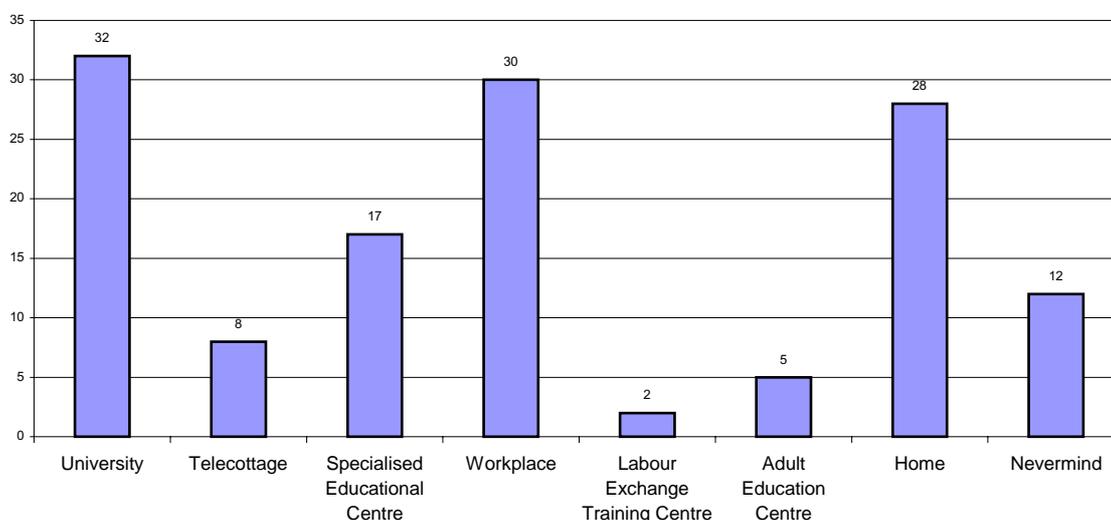


Fig. 1. The most suitable place for Distance Education

One third of the respondents would like to study at home, at work or Universities (33.2 % would like to study by distance education at the University, 30 %- at home, 31.6 % - at work), 17.3 % - in specialized centers, at distance education study centers - 8.6 % of the respondents, it does not matter where for 12.3 % of the respondents, at adult education centers - 5.3%, and at employment centers - 2.5 % of the respondents. Though only 42.7% of respondents have the possibility to study in their selected study centers, 34.3% of them do not know if they have such possibility, and 18.4% - do not have such possibility (there is no any University or other educational center where they could study by distance education near their living place).

Though the majority of inhabitants agree (71% - yes, 23% - do not know, 3% - no, and 3% indicated no answer) with the fact, that it is necessary to organize lectures and to disseminate the information about distance education and provided possibilities. The majority of them would attend courses of continuous education if they were interesting (16% - necessarily, 46% would attend, if they were interesting, 25% - probably yes, 10% - probably no, 2% - not for sure, and 1% - remained passive). Financial problems are the main obstacle for further studies (for 82% of the respondents), as well as limited technical possibilities (50% of the respondents), lack of information (32% of the respondents), lack of time (71% of the respondents), and other reasons. Many of the respondents pointed not to one, but to several reasons.

There was a direct question about the shortcomings of *e-Learning*. Both experts and respondents are not willing to attach much importance to them; for instance, experts are not apprehensive that there might be lessen learning effectiveness because of the limited communication between a teacher and students. Only respondents are afraid that in distance education in addition there is a need for basic skills in information technologies. As the shortcoming of distance education, every fourth respondent and expert indicated that there is a possibility for increasing hostility because of the unnecessary direct communication. It is clear that those willing to use distance education are less emphasizing the shortages of distance education. More than others they are just afraid of the need of additional skills in information technologies.

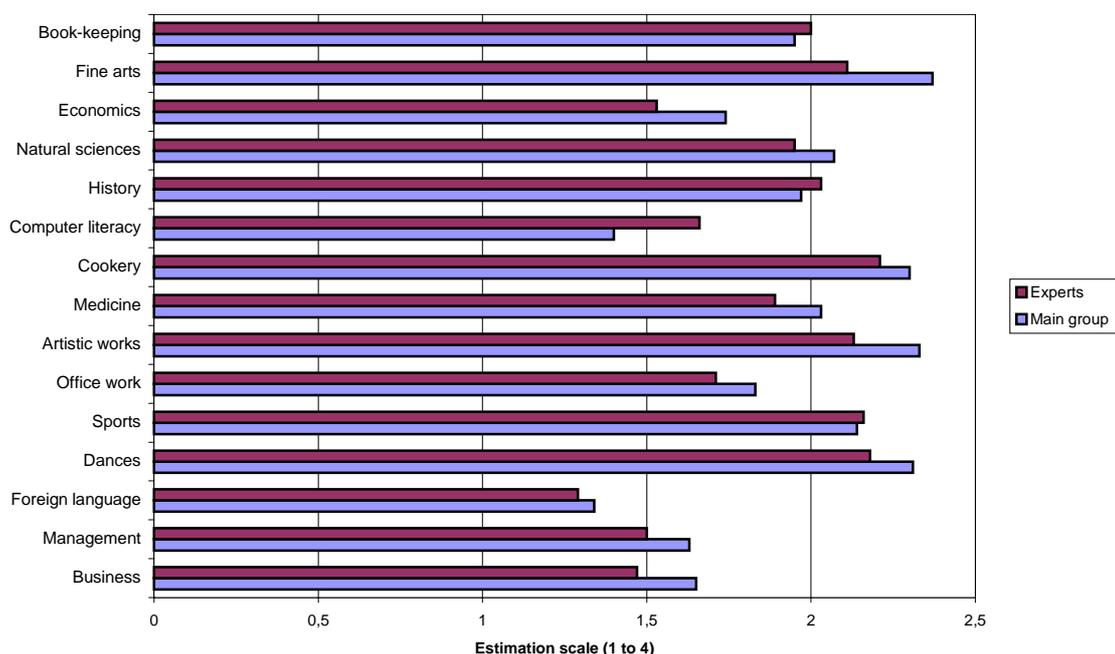


Fig. 2. Subjects, which are attractive for DE studies.

Majority of the inhabitants would like to acquire technical and commercial knowledge (37.3% and 32.6%). Humanitarian knowledge (languages) and social sciences took the third and the fourth places (29.2% and 29.1%). Service training is interesting for 16.9% of the respondents, medicine – 9.8%, and sport – 5.6% of them.

About one half of respondents evaluated **the perspective of *e-Learning*** very optimistically, about one third of them evaluated the perspective neutrally and only a few percent see the perspective pessimistically. Those working with computers are more optimistic about *e-Learning*.

Traditional research universities are in a period of transition, and they could create a new situation for higher education. Universities have to become 'service universities'. The main goal of such universities is to be recognised as providers of knowledge-based services to its region and to the society.

Conclusions:

1. During the last few years there has been realized the importance and essence of *e-Learning* in Lithuania and has been started the initial work to apply the newest ICT in *e-Learning*. The use of modern ICT as well as flexibility in teaching and learning provide new opportunities to create the information society and develop the individual skills of the citizens. The main purpose of *e-Learning* is to provide equal learning opportunities to all Lithuanian citizens. The establishment of new *e-Learning* teaching technologies may significantly improve education in Lithuania.
2. In the development of *e-Learning* higher education institutions should set the aims, determine the needs for the accomplishment of those aims and then find adequate methods, adequate technologies for the accomplishment of those needs. Higher education institutions should always pay attention to the Quality Assurance.
3. To meet new requirements of students as the participants of life long learning higher education institutions have to modernize the studies themselves, refer to the needs of education and have a perspective for a long term scientific research.
4. The analysis of the *e-Learning* motives according the latest results from the questionnaires suggests that at present, in Lithuania, there is a significant need for the *e-Learning* courses.
5. The insufficient understanding of such teaching ways, hidden in the consciousness of the society, large primary investments, and difficulty in calculations of benefits burden the development of *e-Learning* system.

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THE EXAMPLE OF E-LEARNING IN THE GREEK EDUCATIONAL SYSTEM IN THE PUBLIC AND PRIVATE SECTORS. THE ROLE OF CEDEFOP 'S E-LEARNING DATABASE IN EUROPE.

Nikolaos Mylonakis, Cedefop

Introduction

The e-learning market is considered nowadays the third in size worldwide following those of e-mail and e-commerce. In the U.S.A. for example, where the expansion of the e-learning market is considered the biggest worldwide, the total revenues of the e-learning related activities are expected to rise from \$ 2.5 billions to \$ 4.5 billions in 2001, \$ 8 billions in 2002 and \$ 12.5 billions in 2003 indicating a rate growth close to 100% annually.

According to data recently provided by the IDC the value of the european educational market will reach the amount of \$ 7.8 billions by the year 2004, most of which will be related to e-learning .The growth rate of this sector in Europe is estimated to about 106% annually till 2004, whereas Greece is considered to be amongst the four european countries that adopt faster these new technological achievements. Let's see the progress that the Greek State and private universities have made so far in this field.

State sector

Panhellenic school network

The Ministry of National Education and Religions (<http://www.ypepth.gr>) is trying to adjust to the European Union 's directive for the modernization and upgrading of the educational system. In this context, the ministry has launched the action "Odysseia" (<http://www.odysseia.cti.gr>) which is implemented by the "Winds of Aeolos" (<http://odysseia.cti.gr/askoi>) and the Panhellenic Educational Network (<http://www.edu-net.gr>) projects. Both these projects are part of the EPAAEK (Operational Program of Education and Initial Vocational Training) and are financed by the second and the third EU workpackage. Odysseia is an enormous action of major importance since it is considered the milestone of the whole effort. It is in due process, but it's quite far from being considered complete. One of the most interesting aspects of the "Winds of Aeolos" project is that it is going to profit from previously accumulated experience from the application of internet technologies in the educational procedures.

The project "Winds of Aeolos" aims to develop and support the operation of a school laboratories network (projects "Mnistires" and "Ulysses") in a panhellenic scale, thus linking 379 school laboratories in 29 prefectures.

The Panhellenic school network aims to develop a local area network in 29 prefectures. It is hosted by O.T.E. which provides the necessary telecommunicational services and interface, whereas the National Network of Research and Technologies provides the internet access.

The Panhellenic school network ensures that internet access services will be available for all Greek schools. This project is in progress.

Edu-net

Modern school environment requires a group of supplementary internet services well adjusted to the current educational procedures. The planning and implementation of these services demand a different approach and some sensitivity necessary when applying to young pupils. Internet access alone does not guarantee success of the educational goals.

Edu-net is launching an educational-based intranet capable of infiltrating internet access on pedagogically based criteria. According to planning the implementation of a whole range of services who are in due

process and will be able to meet high quality and accessibility standards could finally form the first greek educational portal.

Universities

The e-learning notion – as we have previously illustrated - has significantly changed through the years. The current one combines the following three elements: internet, on-line education and multimedia applications.

Unfortunately any e-learning implementation following a past stage methodology (e.g. on-line tutorials) seems nowadays highly out-fashioned. We are thus very happy to find out that greek universities have already taken the first steps towards delivering on-line lessons the way the most advanced foreign ones have. We can't however still speak of a widespread practice, but only for the first fine examples of work.

Let's begin with the University of Ioannina and its faculty of Medicine (http://medlab.cs.uoi.gr/pages_gr/services/dl.htm)

Lessons or rather seminars are delivered for free on topics such as cardiology, pathological anatomy or biomedical technology. The aim of this site is mainly informative but we can see it as a test of tele-education in Greece. On-line lessons are rich in graphics, specially designed for distant learning and do not require a special plug in for the browser. The interface is pleasant and it is addressed to various audiences including simple users but also students of medicine and doctors.

Aristotle University of Thessaloniki is one of the academic institutions that have made significant progress in the area of e-learning. In a specific page of the site (<http://distance.csd.auth.gr>) lessons are delivered electronically via internet. The educational material which corresponds to these lessons is registered in a central data bank which executes the following operations:

1. storage of information and data relative to the lessons delivered.
2. control and protection of the access to the educational material which is reserved only for students who are about to take an exam or use the software. Thus the program is protected from unauthorized use.

The data bank is built upon the client-server model. The data bank works as a server and stores all the necessary information. The client is a software that the trainee is supplied with and is necessary for connecting to the data bank.

In the ISDN communication network of the Aristotle University of Thessaloniki (<http://isdn.ccf.auth.gr>) you can find statistics concerning tele-education and a far more interesting portal on greek and foreign sites that provide services related to this subject. It's a user-friendly and quite updated index that completes the e-learning services provided by this university which demonstrates the importance laid upon the matter by this particular institution.

Members of the staff coming from all APTh faculties took part in statistical research so that no one interested in the possibilities of modern technology would be excluded .

If we take a general look at the results of the statistical research we conclude that the need for tele-conference systems is enormous and that there is a great interest for the incorporation of the new technological accomplishments to the academic work of the members of the University.

Another interesting proposition for e-learning activities in Greek terms is the Greek Open University site. This particular institute may well be considered as part of this research, as its services are comparable to similar ones provided by homologous virtual institutes abroad. These e-Universities try to locate the closest courses having as criterion the student 's desired subject. The GOU site provides a detailed presentation of all the available courses, in order to keep the anxious student completely informed. There are no on-line courses available for the time being, but this is very likely to change in the future since it would be the natural evolution of the GOU 's efforts.

It is obvious that many experts in Greece have evaluated in a positive way the implementation of e-learning in teaching procedures. What needs to be analysed for the time being is the way of using this methodology in teaching

Private sector

Greek informatics enterprises are vividly interested in participating into what we can call the e-learning services explosion. Domestic enterprises seem to establish themselves more and more as time goes by and to expand the range of the provided services in a business level as well as in a simple user level.

Greek informatics enterprise activities cover the whole range of e-learning services both those necessary to the simple user and those who aim to create educational modules. The quality and the possibilities of the proposed services are equal to those provided by their foreign competitors. We 'll now present to you some of the most significant greek enterprises that provide e-learning services in our market starting from those who provide solutions in a business level and going further with those who address to a simple user.

1. CIN

The transition of the Greek Community from the traditional to the new knowledge-based economy and information makes it necessary for organizations and corporations to continuously update and upgrade the skills and knowledge of their workforce. For this purpose they organize training seminars and are seeking continuous collaboration, trying to respond to the challenges of our time.

However, traditional practices cannot any more ensure the speed and the efficiency that the modern rate of business activity requires. In addition, the participation of employees of a corporation to these events is quite costly as except from the indirect cost of removing an employee from his or her work there is the additional cost of transportation and lodgings.

The solution comes from the new technology and specifically from Internet technology and satellite networks, which opened the path for radical changes in the way these events were organized as we usually call it E-Learning.

This revolution is brought in Greece by a new pioneer company, CIN- Collaborative Interactive Network, which makes it possible for anybody, at home or at the office, via computer, to have a distant in real time - two way participation to seminars, conferences and meetings.

CIN was founded in Athens Greece in May 2000. Company's mission is to supply integrated solutions in education, business collaboration and communication through digital technology networks both via Internet and satellite based infrastructure.

CIN addresses to corporations and organizations of the private and public sector. Their e-Learning products and services include the following:

E/Class

E-class service comes to cover the needs of private and public enterprises as well as the needs of individuals for continuous and life long learning, **providing live on line and off line distance learning through new technologies**

This service in order to respond to the breadth of public demands includes:

E/class/business

- Intra-business Training with Integrated Educational Programs and Adjusted Seminars

E/Class/open

- **Open Seminars of Free Participation**, with a high level of provided lessons ensured and the possibility of users to choose the pace of training

E/Class involves:

- Companies and Organizations of the private and public sector for the training of their personnel in synchronous and specialized matters.
- Organizations providing training and learning
- Persons (employees, unemployed) who have completed a course and wish to go for further training or to specialize in matters of interest
- Persons that due to the nature of their job, geographical or time limitations do not have the ability to attend training programs in the traditional way

CIN can supply more than 1000 on-line and off-line courses in various areas of interest. It can also produce custom made seminars in order to satisfy customers' satisfaction.

CIN provides the necessary technological infrastructure and the tools for the development of E-Learning applications such as CENTRA, TRAINET, DIAS and ESTIA.

2. Compact Computing

Compact Computing was established in 1995 with the aim to cover the gap in the specialized IT training.

Having a qualified workforce as its driving force, Compact Computing can recommend integrated training solutions, customized to your needs.

Compact Computing is offering certified classroom training on Microsoft (Certified Technical Education Center), Oracle (Oracle University Partner), Symantec (Authorized Training Partner), Macromedia (certified training material). More than 2500 people were trained during 2000 by the experienced trainers of Compact Computing.

From 1998 Compact Computing is entering the field of **technology-based training**. The cooperation with SmartForce, the biggest producer of interactive software and provider of e-learning solutions, offers a library of 2000 CBT courses (IT and Business skills), approved study guides, which constitute today the base for **e-learning**. More than 70 of these courses are already localized in Greek and one course is added to the list every week

In this context, trainees can attend a CBT course, participate in a forum, and communicate by mail with the instructor, characteristics that constitute the asynchronous part of the learning procedure. After completing the basic training and with the aim of specialization, the trainees have the possibility to join virtual classrooms, with the use of advanced tools of synchronous communication. Compact Computing has established a strategic partnership with Gilat, the manufacturer of LearnLinc platform used by more than 2000 companies worldwide, in order to cover the field of synchronous e-learning solutions.

More than 50 Greek companies implement e-learning solutions for more than 15.000 employees, whereas more than 2000 are the subscribers of www.e-learning.gr, the first electronic training center.

3. Group3

GROUP 3 S.A in cooperation with other companies supports business in the fields of informatics, high technology, finance.

The need for firms' employers-training has always been intensive. The problems they face are the time pressure, the distance, the lack of feedback in the training effectiveness, the cost and the quality and personalization of the training programmes.

Functions

GROUP 3's S.A Distance Learning Center is divided into two sectors:

- a) Business courses

b) Enhancing courses for students of 12 to 18 years old.

In the Business Courses field up to now there have been prepared seminars in finance, legal issues, information technology, banking, standards monitoring systems. Several employees have attended all courses.

The trainer attends seminars from his own location via Internet.

The seminar software application is monitoring the trainer and gives instructions. The trainer periodically participates in TESTS. The results are coming out based on the scores and time that is spent. The results are recorded and relative to the score instructions are given to the trainer by the system relative to what the trainer should do.

In addition, the system asks trainer to take some actions. In case trainer is not able to undertake these actions, he/she may ask for help (do it for me) and the system does it in his/her respect.

4. IBM

IBM Learning Services (LS) is the largest training organization worldwide with extensive experience in planning, organizing and delivering technology and management training to both our customers and to our employees.

Learning services is part of IBM Global Services, the world's largest information technology services provider, with 1999 revenues of more than \$32 billion. Services are the fastest growing part of IBM, with more than 138,000 professionals serving customers in 160 countries. IBM Global Services integrates IBM's broad range of capabilities - services, hardware, software and research - to help companies of all sizes realize the full value of information technology.

Through our vertical organization we are in position to quickly deploy and position on any country projects the required resources.

The activities and experience of IBM LS focuses on 4 strategic training areas.

1. Content Development (Course Material, CBT's, web books, etc)
2. Consulting
3. Traditional Instructor based Training
4. New Technologies (Distance Learning, Web based Training, e-Learning)

Further information can be obtained from the following URL : <http://www.ibm.com/mindspan>

5. Inte*learn

The term e-learning is used to cover the wide area of using Technology for educational purposes, ie Technology Based Training, either online, offline or by combining these methodologies. The technology platform can be equally wide covering networks, personal computers, Interactive TV, Satellite, Broadcasts etc. According to this term's definition, INTE*LEARN is one of the first companies in Greece that has worked exclusively with the development of e-learning applications since 1989. During these years the educational applications of INTE*LEARN have set the standards of educational software for the Greek market.

The company is specializing in educational design and content development. Numerous educational applications have been developed for major Greek companies, while the Learning Services dept. of IBM Hellas is considering INTE*LEARN as its technical partner for the development of educational software. Since January 1999, INTE*LEARN has strategically decided to use the technology of Lotus Notes as the main authoring tool for the development of corporate training courses. Following this decision, INTE*LEARN has been appointed Business Partner of Lotus and is using the LearningSpace[®] family of products to develop training applications and services tailored to the specific requirements of each organisation. Using this platform, as well as other authoring tools the company is developing custom-made educational applications according to specific requests from Greek companies.

6. Quality and Reliability

Q&R was established back in 1992 as a ‘Societe Anonyme’ offering IT solutions based on Oracle RDBMS. Today the company is among the top Greek IT system integrators with rich experience in the provision of turnkey solutions. Its rapid upward move the last four years along with the strategic decisions been taken by its management, allowed the company to have an impressive growth record which was eventually ratified after the company’s **entrance in the Athens Stock Exchange since August 2000**. This was a financial boost for the company since Q&R collected about \$14,000,000 for investing in new business opportunities as well as for enhancing its existing products.

As a provider of e-Learning Infrastructure offers the full range of products and Services, as well as the Know-how of implementing any Distance training.

TopClass from WBT. It’s a new approach—a powerful e-Learning environment that enables organizations to enhance traditional classroom training with personalized web delivery and to substantially increase “Enterprise-Wide” productivity and effectiveness. By fully exploiting the power of the World Wide Web, Top Class gives you the tools to rapidly transform existing presentations, documents, and multimedia content into complete web-based training courses. With Top Class Learning Objects, learners can easily search and navigate to the exact information they need whenever they need it. Users can learn at their own pace, using any style of learning through any type of media. With Top Class, the system adapts to the user’s specific needs, instead of the other way around. Top Class’s unique class paradigm groups users into classes assigned to a mentor who provides expertise, leads discussion groups, and gives help as needed. Top Class users share information through a powerful discussion group facility that links exchanges back to course materials. For live interactive discussions, we have seamlessly integrated the powerful, easy to use Centra business collaboration and video conference software into Top Class. In addition Top Class includes an integrated class announcement mechanism as well as access to e-mail for personal interactions.

7. Space Hellas

Space Hellas, in co-operation with established software houses and educational systems manufacturers, offers integrated solutions for corporations and organizations, in order to fulfill their various educational needs, from top level management, to lower level staff. The solutions provided, may include applications starting from a sole student and tutor basis, to x number of students and tutors, taking part in a common educational procedure.

Moreover, for smaller organizations, which do not have a network of their own, or for ones that do not have the means for a permanent connection to the Internet, Space Hellas offers them the opportunity to use its network, software and informational systems, for the time needed to complete their lessons. Tutors and students will be able to hire specified time from the company's educational network and use their own PC's and dial up connection to the Internet, using Internet Service Providers.

8. Pliroforiki technognosia

Pliroforiki Technognosia is a company with a long history in educational services. It specializes in research and development of informational systems with emphasis on educational software systems since 1993. Its participation in a vast area of research educational programs has had an influence in the increment in experience and technological knowledge on educational technology. Since 1999 the company has focused on e-learning, offering this way powerful service support in the educational world.

Pliroforiki Technognosia (PLT) has proceeded to a Joint Venture with Intralearn Software Co. leader in e-learning solutions, bringing E-Learning to **Southeast Europe and Russia**. Intralearn Southeast Europe (**ILSE**) opens the market by promoting Internet-based educational items and services in Greece as well as in Albania, Belarus, Bosnia-Herzegovina, Bulgaria, Czechoslovakia, Slovakia, Croatia, Cyprus, Estonia, F.Y.R.O.M, Latvia, Lithuania, Moldavia, Rumania, Russia, Slovenia, Turkey, Ukraine, and Yugoslavia. Apart from reselling the program, PLT specializes in the instructional design and implementation of distance learning courses for all levels, from secondary to vocational education.

The role of elearning database at Cedefop in Europe

The eLearning pages at the ETV aims to provide elearning resources including information and links to products and services as well as research papers and reports to training practitioners and policy makers. The data is structured in two ways. Links to web resources and information sources are provided through a short database with a title of the page, the URL, and a short description. These are stored in our database and can be searched according to key words.

A second much more detailed database is for storage of elearning resources (i.e. learning objects) and is structured according to the IEEE LOM (Learning Object Metadata) standard. It utilises exactly the same descriptors as the most up to date version of the LOM standard and aims to describe learning resources in the same way as required by the standard. The database has a front-end wizard which aims to provide users with a user-friendly tool to encode directly data about their learning resources.

It has lots of help fields and pull down menus and can be accessed online through the eLearning pages of the village. It aims to support training practitioners and learning resources designers unfamiliar with the LOM standard in understanding how to structure information about their resources. The database can be searched by any of the descriptors in the standard.

The emerging metadata standards in eLearning offer real opportunity to ensure the results of all European funded projects producing elearning results can be made available and accessed openly and across all platforms. Metadata standards combined with emerging technologies such as XML will enable all those producing tools and content in eLearning to ensure interoperability and open access to their results

The most obvious starting point is that all European funded projects developing eLearning tools, platforms and content should be required to conform to the standard. This means that projects must describe and classify the information about their products and services according to the standard.

This would allow information about all these results to be shared and exchanged across all programme databases at local, national European and web levels. It will mean much better information for the European Commission and Member States to analyse the status on currently available resources, thus improving real development and value added, and will provide users including trainers and teachers access to a large rich European eLearning resource base.

A MATTER OF DEMOCRACY: FINDING NEW WAYS OF COLLABORATION BETWEEN (SMALL) MUNICIPALITIES AND INSTITUTIONS FOR HIGHER EDUCATION IN SWEDEN.

Hans Lindgren, Högskolan Höglandet

Step I – “Education for all”

During the last five years the majority of the Swedish municipalities have created local study centres in order to provide “education for all” on upper secondary school level (Sw. gymnasium) or to provide other courses needed for specific occupations. In 1997 the Swedish government started allocating money for 100 000 pupils per year to start or complete upper secondary school courses, not least in order to reach access to university studies. The target groups were initially unemployed persons, women with non-professional occupations, immigrants, disabled persons, and employed persons with too low educational level to be guaranteed employment in the future.

This governmental project, “The Knowledge Lift” (Sw. “Kunskapslyftet”), was supposed to be an important component for the democratic education of the Swedish people, as well as a way of creating educational democracy for the people. Indeed, this was a huge project compared to the Swedish population of 9 million inhabitants. And it really became a success: several hundred thousands of persons have reached the governmental goals to get a ticket to higher education.

“The Knowledge Lift” was a governmental initiative, and the government authorities decided about the allocation of the economic resources to the local providers of education. On the other hand it was delegated to the Swedish municipalities to plan and to perform the local offerings of education. Practically, the municipalities once a year was to declare their ambitions to the government – to formulate the educational goals – for “The Knowledge Lift” in their own municipality. This declaration was evaluated quantitatively as well as qualitatively, and was also the base for the allocation of the money to the local providers of education. One year later the municipalities got more money or had to refund money depending on the educational results compared to “the declaration of educational ambitions” the year before.

The last two years many municipalities in Sweden have had difficulties to find adult persons for their upper secondary school courses in “The Knowledge Lift”. One explanation is the economical high conjuncture: persons choose unqualified jobs before studies. Another explanation is the earlier success: that in some regions it is difficult to find persons within the former target groups, which have not reached the formal demands to get access to higher education. On the other hand the demands from small and middle-sized municipalities in Sweden for higher education now have increased from the former target groups of “The Knowledge Lift”.

Step II – “Higher Education for all”

One main principle of the Swedish university system is that every citizen should be given the same chance; consequently education is principally free of tuition fees and study fees, and every citizen who has achieved the formal demands to enter academic education can compete on the same conditions to get an academic enrolment. Another main principle is that every Swedish citizen should be guaranteed equality in access to universities, in quality of education, and in treatment as a student.

Local study centres as democratic compensators

In practice, many persons, and even groups of persons, so far have been excluded from higher education in spite of their formal competence. Geographical, institutional, and social conditions work against the principles of equal educational conditions for all citizens. Only a few cities or large municipalities have their own universities or institutions for higher education on site.

Some small or middle-size municipalities have, on their own initiatives, tried to compensate this unequal situation of the university system by providing higher education in their local study centres created during the initial period of “The Knowledge Lift”. Today, briefly 150 of the 288 municipalities in Sweden provide some or sometimes a large amount of university courses and even complete academic programmes via local municipality study centres.

Geographical differences

However, many municipalities still have not had the economical possibilities to make such efforts on their own. And even among municipalities, which have created such possibilities for their citizens, the conditions vary essentially. Some municipalities still have to bear all local costs – and sometimes even some parts of the budgets of the cooperating universities – for higher education provided at their local study centres. Other municipalities receive to a large extent support from e.g. the structural funds of The European Community. Those funds direct resources to geographical regions with structural problems.

One aspect of geographical equality, therefore, is the essential differences in economical support to municipalities providing higher education for their citizens. “Total” economical equality of higher education ought to mean, that every municipality in Sweden have the same economical support per student. To complicate this, the basic economic conditions of the Swedish municipalities as well as the local support system of higher education vary a lot, which means that a national education support system could need some principle of solidarity. Any way, the model of “The Knowledge Lift”, described above, could be used to allocate financial support to local study centers all over Sweden.

Another aspect of geographical equality is the demography of the students. For many students from our main target groups it would be impossible to study – at least for during longer periods – if they had to study outside their home regions. In addition, we know that traditional universities as well as regional universities have been unsuccessful to serve the regions outside the local university cities. The efforts of the municipalities and the local study centres are essential to break the geographically unequal offers of higher education in Sweden.

Institutional conditions

One experience, that many municipalities and even students have pointed out, is that universities and institutions of higher education often have been offering courses to the local study centres, that nobody have asked for. Briefly, the institutions of education dictate the conditions, and many times has that meant, that the local courses have been those courses with a low rate of applications on campus. The study centres were seen as a possibility for the institutions to solve their bad planning. Consequently the students did not find the local course offer relevant.

From a democratic point of view, equality of higher education also should implicate the capability of the producers of higher education to cope with the students wishes. Or, to use the words of Frederico Mayor: “ethics of education is to listen – to ask what you need, not tell what to do” (ICDE, 5/4/2001). That means that also the offering of courses and programmes via local study centres should be governed by the local students’ interests and demands.

During the last few years, local study centres in Sweden have very been skilled in mapping those interests and demands. Their staffs have made their own opinion polls or have consulted professional public relations institutes for that purpose. On that base they can bring the local demands of higher education to the cooperating universities. Hopefully, the results will be a large variety of courses, wanted by the local citizens, provided via the local study centres of the municipalities.

Finally, equality of higher education also raise demands on the administration and organization of courses and programmes at universities and institutions as well as at local study centres. Time-tables often do not cope with the students life pace. Local study centres, however, to a large extent give the local students the possibilities to study and work (often full-time) side by side. For example, local courses are normally given on part-time basis (half-pace or quarter-pace).

Social conditions

In this paper, local study centres for higher education – mainly using video conferences – is in focus. The main reason is the importance of the local study centres mode to educate for the success of the main local target groups of higher education. These students mainly are comparably low-educated adults in the ages of 25-55 years, and mainly working for wages parallel to their studies. Still, a large amount of the new students have no experience from using computers at home or at work.

When asking these students if they should have followed the same course they attend, if it was given only on campus, eight students of ten answer No to that question. The synchronous mode of on site and video conference meetings is not seen as a problem, but more a privilege. Web-based courses on Internet is no alternative for these student groups.

Most remarkable is, that most students have no former experience from higher education, nor have sisters and brothers or fathers and mothers with academic experience. The Swedish government has since 1968 made great efforts to recruit students from homes with non-academic background. However, the segregation on the universities has instead increased during the last ten years. Higher education via local study centres can change this.

The student in focus

The great social success at the local study centres has, of course, several explanations. The most important one, according to local studies, is that the small study groups at the local study centres make uncertain students feel comfortable. The staff and facilities of the study centres are important, too. Also, the social incitement to continue is essential in a local study group, and when problems, the students will solve those together. Many students say that the contact with the teacher by video conference is more intimate than on campus.

Finally, several studies from different parts of Sweden show, that university students studying at local study centres have better study results and also have higher examination rates than students in the same courses on campus.

Finding new ways of collaboration

It has already been said, that listening to the students wishes and demands is crucial for the equality and the democracy of the higher education. Now, it could be rather unpractical if every presumptive student in person should express his/her will to the universities or to the local study centres every year. What remains is to find out a reasonable method to find out the collective wishes and demands in each municipality and to express these to the cooperating universities and institutions.

The tools of finding out the wishes and demands of the local students have, in brief, already been mentioned. There are professionals to consult, and there are well-known methods to use. Therefore, it is supposed that the reader is familiar to this side of the coin. The other side – expressing the collective regional and local wishes and demands to universities and institutions – is normally a much more complicated task. Let us look at this.

Pennies from heaven? No way.

Many officials of the municipalities seem to believe, that they can get what they want from the institutions of higher education if they only look nice and present their “Christmas-gift lists”. In reality, a large, broad and growing offering of courses and programmes over long time demands collaborating between several municipalities. For example, one single municipality in Sweden seldom is a market big enough to fill up university courses by itself. To reach the educational aims and goals of the local municipality, it is necessary to prepare for the meeting with the producers of higher education together with other municipalities.

If you want to get married you have to be engaged

I could be reasonable to begin with the own organization. Receiving higher education demands special employees with special competence, as well as facilities of different kinds. The organization could have very different forms: for example it could be a formal organization (enterprise) or an informal organization. What is important is that it fulfils its aims.

The social element of the organization should not be forgotten. To achieve confidence among the colleagues in the staff, it is necessary to have time together, sometimes away from the ordinary working place. Together you can formulate the aims and goal of your organization. Before meeting institutions of higher education it is important to know what you want from the institutions. The demands could be both qualitative and quantitative ones.

The next very important step is to build up regional networks together with other municipalities. Also in these new relationships it is important to formulate distinct aims and goals together. And, of course, to be good friends (the social element again).

Using the democratic system

In Sweden, the management of the local study centres normally are put directly under the local government of the municipality. This could be useful. If the local board of politicians from a number of municipalities go together and present the municipalities common educational needs and demands, the institutions of higher education will listen. Therefore, it is necessary to create regional networks of politicians, and that its politicians express the aims and goals of higher education in the local municipalities of the region with one mouth.

Before, it is necessary to feed the politicians with basic facts and good arguments. Remember, that the managers and their staffs of the local organizations are the real experts of higher education in the municipalities, or region if you work as a regional coordinator of higher education.

The politicians should in the first run turn to the local university, or a university which spontaneously is felt as the normal cooperating partner in the first place. Instruct the politicians to turn directly towards the headmaster of the university. No low officials here.

The coordinators of higher education shall follow up this headmaster meeting with a concrete proposal to cooperate. They shall always be well prepared; it is important that the municipalities know what they want together, and that the collaborating municipalities can present appropriate needs and demands of the region.

Formalize the regional collaboration

To begin with, the coordinators of the municipalities need a common calendar with fixed routines and times for one year. This could be important deadlines for the collaboration.

In the authors regions in Sweden, 11 municipalities are following the guidelines of a common "book of methods", where relations on and between different levels of the collaborating organizations are described, and where the responsibility of the different persons in the staff is pointed out.

Since some years, all regional and local coordinators of higher education in the authors region have had several two days meeting a year to plan common strategies for providing higher education in our regions. Once a year the local university invites the regional and local coordinators together with their deans to another two days meeting, mainly for the same purpose. Also once a year, the headmaster of the local university invites the regional coordinators of higher education, all the chairmen and the administrative directors of the municipalities of the county (13 municipalities) to discuss the ongoing collaborative efforts with the headmaster and the heads of the institutions. Here again, the political system is used to provide democracy of higher education in the region.

Finally, and perhaps most important, the headmaster two years ago founded an advisory board of flexible learning on the local university. The chairs are held by the three regional coordinators of higher education employed by the 13 municipalities of the county, one representative from each four faculties of the

university, one student representative, one official from the library, and as chairman the director of the headmasters office. This board handle every important issues of distance education or decentralized education at the local university.

The advantages for universities working with local study centres

Many institutions already have seen the large amount of advantages from the collaboration with local study centres. Today, the local study centres contribute with a great deal of the students on free university courses. In our region, eight students of ten have found their way into higher education as a result from the public relations efforts of the local study centre. We can see the same statistical figures at study centres all over the nation. In that way, the local study centres provide the collaborating university institutions with a student input of 80 % of the persons studying via local study centres.

Cooperating with local study centre networks is another good thing for the cooperating institutions – it is a good economy of time. Finally, the social effects mentioned above, is not less than a social revolution in the higher education system, initiated by the local study centres of the small and middle-sized municipalities.

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IMPLEMENTING PROBLEM ORIENTED LEARNING - IN THE MINDS AND ON THE WEB EXPERIENCES FROM AN INTERREG II PROJECT

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Introduction – IT for Regional Development and High Quality of life

This paper will present experiences from an Interreg II project founded by the Social fund II A, Inner Scandinavia, with co-financing from DISTUM, the Swedish Agency for Distance Learning. The project is a co-operation between two Norwegian and four Swedish partners. 11 integrated working teams with a total of 66 people have not only produced the courses but also implemented them on the web and made a pilot run on a newly developed technical platform. This paper will report from and comment on the whole process and try to make a few conclusions.

Project objectives

The project started with objectives of different kinds. In line with the objectives with the Interreg II programme the project aimed at

- Producing and delivering 12 courses for Problem Oriented Learning designed for flexible competence development and distributed over Internet
- Putting the educational institutions of Inner Scandinavian working with competence development in the frontline of life long learning by offering competence development to faculty members
- Establish a collaborative network of educational institutions
- Establishing networks of people engaged in life long learning on both sides of the Swedish-Norwegian border in Inner Scandinavia

All these activities should contribute to the competitiveness of Inner Scandinavia.

Course development for problem oriented learning

The pedagogical framework for the courses to be produced was already defined in the application for the project. It was stated that the project should use high tech solutions for offering competence development to employees in Inner Scandinavia on a problem oriented basis. It was also stated in the application that the project should offer support to teams of course producers based on the Market model¹ for course development mainly developed by Norway in a Nordic context.

The project had started in 1997 with a needs analysis and the production was started in January 1999. Course production managers were already appointed before we started in 1999. The production of the courses was delegated with full responsibility for appointed course managers to set up a production team and a reference group with representatives from the target groups of the course. The course manager was also fully responsible for the content and the way the content was structured.

As Problem Oriented Learning and the Market method was not well known to all members in the production teams in April 1999 we offered a two days introduction to the project itself, to problem oriented learning and to the Market model for course design.

For some members distance learning was also new, and the technical development is so fast, so we decided to have a two days workshop presenting the latest tools for communication and co-operation over

¹ Minken and Stenseth: Brukerorientert programdesign

the Internet in August. The objective was to open the minds and really telling that what you want to do from a pedagogical point of view is also possible to implement on the web.

The real production started with a full week workshop in the end of October 1999 for all 11 teams of course developers. The focus for the workshop was on content and pedagogy. The demands from the teams of course developers should be the basis for purchasing a technical system for implementation and learning on the web.

During this workshop continues tutoring was offered and meetings for exchanges of experiences was scheduled. A short evaluation was also conducted after each day and commented in the morning the next day. As the teams of course developers were mainly subject area experts we also offered help for prototyping to get an early impression from the screen. Most courses got their main design during this workshop.

A first follow up meeting was arranged in January 2000. At that point a general structure for all courses could also be defined and agreed upon. We decided not to use the classroom as a metaphor in our learning as it sends the wrong kind of signals. In stead we decided to use *Arena for learning*.

The main parts for each course should be

- a video trigger presenting a problematic situation as a base for problem definition
- access to a basic set of learning material to be completed by the learners themselves
- tools for doing a learning dialogue
- tools for doing collaborative work at a distance
- tools for self reflection and the possibility to share these reflections with other people

In addition to these resources we should support setting up a study contract for each study group. We also had a long discussion whether we should offer tests or not. The result was that we do offer the possibility for the students to set up a test for peers to take. We will enhance the learning part of producing a test. The same facility can of course be used by tutors or for examination.

The courses should be modularised and it should be possible to share modules and different learning materials between modules and courses. It should of course also be possible to produce the courses at a distance and the production team should be able to be located at different places.

At that point in time, end of January 2000, we had defined the basic need of the technical platform needed. After a short market analyses we decided, also as part of the internal competence development, to produce a system of our own. Iparex, a Norwegian company, was selected for the task and they started the work in March 2000. The system was named Q-Learn, stands for Quality Learning. The first Q-Learn prototype was up and running in June 2000 and the first courses implemented in October the same year. At the end of March 2001 all courses but one has finished its pilot testing. We should add that continues upgrades have been done of the system during the pilot testing.

Invitations to a two days workshop for tutors was sent in October but neither course producers nor tutors had time taking part of such a workshop so it was cancelled. Cancelling this workshop turned out to be a big mistake.

Results

The project has produced what was promised. We have produced 12 courses as intended, we have produced a tool for producing and offering competence development over internet and we have offered competence development for POL courses to a large number educators and offered competence for purchasing competence development to a large number of representatives from the target groups. There has also been established a number of personal networks that has already been engaged for new activities and four Norwegian university colleges have formed the University Alliances Inner Scandinavia, UNISKA, together with one university and one university college in Sweden. UNISKA has established itself as a regional partner for development by research and education.

In all we can say that all objectives have been met.

Conclusions - technology

In the project we have experienced all the problems well known to people engaged with developing a new tool for distance learning. That was expected and you never know when it is better to accept an existing system with some loss of functionality compared to your specific demand or producing a new one. We couldn't tell before the project and we can't tell now. What we can tell is that we are more aware of all the problems and costs that is connected with running a server of our own contra leasing space on an existing server. Freedom has its price.

Maybe it is worth mentioning that it is our intention in the next version of the Q-Learn software to simplify most parts of it. Having a very large group of people defining the functions needed almost by default leads to a system that will be too large and too complex. Even if it is the choice of each course producer to decide what resources to be use in a specific course the trend is to take it all – it might be good for someone. But at the same time it certainly brings problem to many others!

With this introduction you understand that we have had some problems with the system but not only with the system. Before deciding to use the Internet and the web and again before recruiting to the pilot courses we had defined some skills to be met by the learner. They should be computer literate, i.e. know how to use the Microsoft Windows File Manager system and they should be familiar with MS Explorer web browser and be able to navigate on the Internet. Using search engines and visiting specific URLs should also be no problem not to mention using e-mail and word processing. These basic skills were not met by all learners and of course, in combination with a Q-Learn that was not at its best all the time, this also coursed some problems.

Conclusions - pedagogy

One of the courses produced is *ICT and learning*. This course, or modules from it, was intended to be used mainly to introduce Problem Oriented Learning to the user. As we run into a time shortage it was not possible to use this introduction and we can now say that it is badly needed. Our target group is adult learners and they expect structured learning where memorising is a basic element. Problem solving with an active student who has to take responsibility for pacing his own learning and where understand not remembering is the main thing causes some confusion at first. Lack of experience from academic studies and doing study planing doesn't make it more easy. In short, both our technical and pedagogical support to the learner could have been better.

We should mention that all courses used a physical meeting as a start where introducing the pedagogy and technology were in focus but this was obviously not enough.

Conclusions - tutoring

Process tutoring and subject area tutoring are not the same and it is definitely a profession different from lecturing. In general we can say that we need better skilled tutors – the workshop would have helped. When the technical infrastructure is breaking down, as it is from time to time, and the pedagogy is not transparent to the learner the tutor is the only person who can help and still make the studies a success.

A good tutor use adequate technology, telephone and fax works most of the time, and is not a slave under one system. A good tutor knows how to interact to have a dialogue running and knows that you can not wait for an answer or a question in the same way as you can in a classroom. A good tutor knows how to give support and to bring enthusiasm also for small progress. A good tutor knows how to structure or to put the relevant questions opening the insights of the learner to choose a slightly different direction of his learning. A good tutor is of course also familiar with the general concept of the pedagogy and the objectives and the structure of the course. Especially in a pilot project it is an advantage if the tutor has been at least somewhat involved in the course development.

What is happening now?

We will offer better pedagogical and technical support to the learner and we will also offer competence development in tutoring to subject area specialists. We will also improve the technical platform but this

will probably not be enough. It is our belief that we have to widen our perspective and take a holistic view of the learner as the concept where the social needs are given more attention.

- How should learning centres be organised and how could we better use their services?
- How can we engage local tutors/mentors?
- How can we utilise the learner's real competence from doing high quality work for a number of years when offering competence development for formal degrees?

But the largest challenge of them all is still waiting for an answer – how do we reach those employees who are not enthusiastic for on-line competence development at all but need it never the less?

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NATIONAL INSTITUTE FOR DISTANCE EDUCATION IN SWEDEN

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Presentation of the organisation

The National Institute for Distance Education in Sweden (NIDE) is since 1956 a public authority under the Ministry of Education and Science. We provide distance-education for adults at a secondary or post secondary level, mainly according to national curricula, and have about 30 000 course-participants annually. NIDE has also been assigned a strategic role in the development and implementation of ODL in Swedish municipalities adult education.

We are offering a flexible enrolment and examination based on individual progression schedules. Depending on the local possibilities students may work in facilities in their neighbourhood, "Studyshops", governed by the local community in co-operation with us.

Flexible learning in focus for development

We work throughout Sweden in a wide range of fields concerning development of ODL. Our experience and the modern society's demands for more flexible education and models for life long learning has emphasised the developmental work at NIDE. In this context, internet-based courses have come to play an increasingly important role. There is a continual development of methods, use of distance learning media and forms of studying using new information and communication technologies.

Independence and flexibility for students include individual support through tutors, thereby we offer a variety of ODL pedagogy and methodology courses and counselling for personnel in the municipalities adult education.

NIDE is also working in co-operation with other national and international organisations, for example to design courses for groups of students with specific educational requirements; developing ICT use in ODL.

To keep a high quality in our work, we are trying to increase the organisation's competence concerning pedagogy and methodology by finding ways to evaluate and analyse the area we are working in. This is done both with own resources and in co-operation with others, for example the Swedish Agency for Distance Education.

At the EDEN conference we will show some examples of projects we have performed in collaboration with different companies and organisations.

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ONLINE TEACHING AS A CATALYST FOR CLASSROOM-BASED INSTRUCTIONAL TRANSFORMATION

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Abstract:

How does the experience of teaching an online course effect classroom teaching? We heard from 255 online teachers from 31 colleges in the SUNY Learning Network about the effects of conceptualizing, developing, and teaching a complete online course on different aspects of their classroom instruction. Questions focused on instructional design, pedagogical reflection, alternative means of instruction and assessment, and the overall effect on classroom teaching. Evidence suggests the experience fosters pedagogical review and instructional transformation. Also - A recent sample of these same online instructors revealed that approximately 95 percent are satisfied with online teaching; said they would teach another online course and that they would recommend online teaching to a colleague. Additionally, during the same period, approximately 90% of students reported high levels of satisfaction and learning in this environment. This level of satisfaction and learning was achieved in a unified system comprised of over 1000 online instructors from 47 different colleges offering over 1500 online courses to more than 20,000 enrollees.

Statement of Problem:

This paper addresses the complex issue of transforming higher education from a teacher-centered to more learner-centered model. Clearly this is a process which will only occur in stages. One of the first stages is awareness and reflection. What kinds of experiences allow instructors to examine their pedagogy to begin this process? Can developing and teaching an online course serve as a catalyst for instructional review which leads towards instructional change in the classroom? What evidence exists to support the position that well coordinated programs of academic support and training for online instructors allows for the kind of pedagogical reflection that begins the process of educational transformation?

Description of the project:

The SUNY Learning Network (SLN) is the on-line instructional program created for the sixty-four colleges and nearly 400,000 students of the State University of New York. The primary goals of the SUNY Learning Network are to bring SUNY's diverse instructional programs within the reach of learners everywhere and to be the best provider of asynchronous instruction for learners in New York State and beyond.

Ongoing questions about faculty reactions to online education have led us to seek understanding about the effects of online development and teaching on a variety of instructional variables. For example, is the online environment appropriate to a large range of disciplines or do faculty feel that certain subject areas are impossible to implement online? Do faculty who teach online feel isolated from students or that they do not know the students? Do faculty feel that students in the online classroom perform less well than students in the traditional classroom? Do faculty feel that developing and teaching an online course requires more time than traditional courses? Of particular interest - how does the experience of teaching an online course effect classroom teaching?

Through the implementation of a thirty-two question online survey, we heard from 255 online teachers from 31 colleges in the SUNY Learning Network. Part of the survey focused on general reactions to online course development and instruction and part focused on the effects of conceptualizing, developing, and teaching a completely online course on different aspects of classroom instruction. These questions investigated online education's impact on systematic design of instruction, pedagogical reflection, opportunities to consider alternative means of instruction and assessment, and the overall effect on classroom teaching.

Why should we feel that developing and teaching an online course would have an impact on regular class instruction? What evidence exists to suggest a sustained opportunity for pedagogical reflection is allowed through this experience. One piece of evidence: through previous surveys we learned that faculty reported spending a great deal of time and effort on the development and teaching of online courses. In the most recent survey, for example, the most common response to the question - "How much time did you spend developing your online course?" was "More than 120 hours". We suspected that this level of effort might offer opportunities for reflection that would spill over to the classroom.

It should be pointed out that this development time is not spent alone. All faculty who participate in the SUNY Learning Network agree to participate in rigorous preparatory training, and receive ongoing support during the entire time they teach their courses, both from the trainers, multimedia instructional designers and a faculty helpdesk. Training begins with participation in an online all-faculty conference which mirrors the environment in which faculty will eventually instruct. Through participation in this online conference new faculty come together to experience firsthand what they and their students will do in this new learning environment. The all-faculty conference uses the same technology and interface that the new instructors will use and provides opportunities to discuss a variety of common concerns, all within the online environment. Through this experience and through twenty hours of face-to-face training, faculty explore the idea that online instruction does not simply entail mimicking what happens in the classroom, but rather, requires a transformation. Common issues which arise include how to best create an environment in which students get to know the instructor, each other, and have ample opportunities for quality interaction and feedback. In order to fully exploit the unique opportunities of online instruction faculty are encouraged to reflect on their instructional goals and then to investigate, with the help of a multimedia instructional designer (MID), how best to translate and achieve those goals online. The faculty helpdesk provides continuous support to answer technical questions and make the technology as invisible as possible.

Inasmuch as faculty develop and teach their courses with the assistance of face-to-face and online training, with ongoing support of an assigned and dedicated MID and the SLN Helpdesk, we believe there is an opportunity to discover whether the faculty development and course design process, including all the faculty support this process entails, might have an effect on pedagogical reflection and classroom instruction. Results, reported below, are encouraging.

Results/Outcomes

"It's very clear to me that the students are the real teachers in online courses - mini lectures; and all the other devices are simply resources that they can call upon. I find it somewhat amusing to read how some entrepreneurs believe that the internet offers them the "advantage" of hiring and using virtuoso teachers. In my opinion these "star" performers are relegated to entertainers on the web. I say again: the real teaching is done through peer discussion with the formal instructor adopting the role of moderator."
Survey Comment from an SLN Instructor

Rather than go into great detail on the more than 8,000 answers we received from the 255 respondents to the thirty-two survey questions, this section will provide some details on the faculty's general reactions to online instruction and greater detail on those responses which provide insight about the effects of online instruction on pedagogical reflection and classroom based teaching. A few comments that were typical of respondents are also included.

General Reactions

"Terrific experience! Can't wait to do it again!" Survey Comment from an SLN Instructor

First, we wanted to get a general understanding of how faculty felt about the entire experience of developing and teaching an online course. The survey asked them to rate their level of satisfaction using a Likert type scale. To the question "How satisfied were you with the experience of developing and teaching an online course?", approximately 96% expressed general satisfaction and approximately 4% expressed general dissatisfaction.

Student Performance

"How would you compare your online student's performance to in classroom performance? - online students performed better (they had an incredibly high level of performance that I do not believe I would have had in a classroom environment)"

Survey Comment from an SLN Instructor

We also wanted to understand how faculty perceived student performance in online courses as compared to similar classroom courses. To the question, "If you have ever taught this course in the classroom, how would you rate your online students' performance to your classroom students' performance?", respondents were twice as likely to report better performance from their online students than their classroom student. Approximately 33% reported better performance from online students, about 41% reported no difference in performance, and approximately 14% reported better performance from classroom students. The remainder did not teach the course in the classroom.

Interaction

"An advantage is the contact with students - they share things I do not believe they would tell me otherwise. The instructor has to be prepared to be available and responsive - I am; and I think as a result the experience is enjoyable for all. Another advantage is the discussion list - timid students are empowered - dominant students are curtailed a bit; and all students must think about what they are contributing instead of being put on the spot and just spewing out something"

Survey Comments of an SLN Instructor

We feel that importance of interaction in teaching and learning cannot be understated. Through interaction with the instructor, peers, and course content students have the opportunity to negotiate meaning and connect new concepts to previous knowledge. One measure of this important variable is faculty perceptions of interaction. To the item "Compared to classroom based teaching, rate your level of interaction with your online students" online faculty were, again, more than twice as likely to rate their interaction with online students as higher than their classroom students. Approximately 61% felt that their level of interaction with students was higher online than in the classroom, approximately 28% saw no difference, and about 26% thought the level of interaction was lower online than in the classroom. The remainder did not teach the course in the classroom.

We asked a similar question regarding interaction *between* students and found the following results - online faculty were more than twice as likely to rate interaction *between* their online students as higher than their classroom students. About 60% rated interaction between online students higher than their classroom students, about 28% saw no difference and 26% rated interaction between their classroom students as higher than their online students. The remainder did not teach the course in the classroom.

Appropriateness of the Online Environment

We were curious to know whether instructors from different discipline areas had different opinions on the appropriateness of their course content to the online environment. One could hypothesize that certain content areas might not lend themselves to the kind of conversion necessary to success in the online environment. Respondents to the survey taught in the following discipline areas - Math/Science, Humanities, Business/Professional Development, Art, Social Science and others. To the question - "Do you think the online environment is appropriate for teaching your course content?" approximately 91% said "yes", about 7% were undecided and about 2% said "no".

Knowledge of Students/Isolation

"Getting to know students" is different; interaction is in a different way. Hard to gauge a comparison. In some ways; I thought there was more interaction; but I had a hard time remembering what background went with what student. In the classroom; I had an appearance to attach to the words. Here just a name. I found myself having to keep a "log" on each student to remember simple; notable; important descriptors that would be automatic in the classroom. This made me feel a little more isolated from them; than when I am "in person." Survey Comments of an SLN Instructor

It is natural to be concerned about the effects of teaching online on the degree to which faculty get to know their students and on feelings of isolation. One could certainly hypothesize that the online environment might be cold, sterile, and anonymous. To determine to what extent the faculty became familiar with their students we asked the following questions - "Compared to similar courses you have taught in the classroom, how well did you get to know your online students?" Approximately 37% felt they knew their online students better than their classroom students, about 25% felt there was no difference, and 35% felt they did not know them as well. Regarding feelings of isolation we asked the for responses to the following statement, "Developing and teaching this course made me feel isolated from my students." Approximately 73% of respondents expressed disagreement, about 37% expressed agreement.

The majority of the faculty who teach within SLN have never taught an online course before and many report only average computer skills. So we were interested to know about the effect of online course development on faculty understanding of teaching with technology. We asked for reactions to the following statement - "Developing and teaching this online course improved my understanding of teaching with technology." Approximately 97% of respondents agreed, about 3% disagreed.

Alternative Means of Instruction, Assessment and Systematic Instructional Design

"I enjoyed this class very much. I was very nervous about this before I started; but the support I received both from my mid and other experienced faculty; and the help desk was very helpful and I am teaching this again. I learned a lot about the type of interactions; and I am making changes in the structure of my course; to hopefully improve it this semester. Like any other course that you teach first time; you need to learn from and make improvements. I am not discouraged at all from the way that things went. I look forward to teaching it again." Survey Comment from an SLN Instructor

In order for instruction to become more learner centered, faculty must have an opportunity to consider alternatives to traditional methods and to be able to engage in more systematic design of instruction which incorporates those alternatives. Considering all the time and effort that faculty reported expending, we wondered whether the experience of developing and teaching an online course afforded such opportunities. Apparently it does. Approximately 97% of survey respondents reported that developing and teaching their online course offered them a new opportunity to consider alternative means of instruction, and approximately 93% reported that the experience offered them a new opportunity to consider alternative means of assessment.

Regarding instructional design, we asked the following question - "Think about similar courses you have developed for the classroom - relative to those courses, how likely were you to systematically design instruction before teaching the course?" Respondents were more than nine times as likely to report more systematic design of instruction for their online courses than for their classroom courses. Approximately 58% of respondents reported higher levels of systematic instructional design online, about 37% reported no difference and about 6% reported less systematic design of instruction online.

Although very high percentages of faculty reported that the experience of developing and teaching and online course offered them opportunities to reflect on alternative means of assessment, alternative means of instruction and more systematic instructional design do they transfer that knowledge to the classroom? Since we feel that the process of instructional transformation begins with an opportunity for reflection we asked faculty to respond to this statement - "Developing and teaching this online course provided me with an opportunity to reflect on how I teach in the classroom". Apparently it does. Approximately 94% expressed agreement with this statement. Reflection is, however, necessary but not sufficient. Do faculty feel that this opportunity for reflection will have any impact - will the experience of developing and teaching an online course actually improve the way they teach in the classroom? Results are encouraging - approximately 85% of respondents felt that the online development and teaching experience would improve the way they teach in the classroom.

Importance or relevance to other institutions

While these results may not be generalizable to all institutions of higher education it is important to note that they were obtained from over 250 online educators from 31 different institutions teaching at the community college, baccalaureate and graduate levels.

Why are these results important? Developing an online learning environment is not a trivial endeavor. A great deal of time, money, and effort must be applied to achieve success. Can online learning be implemented in such a way that both faculty and students report high levels of interaction, satisfaction and learning? From these results (and the results of SLN student surveys) the answer appears to be yes. Can online learning be implemented in such a way that faculty report they have opportunities for reflection on such important pedagogical variables as alternative means of instruction, alternative means of assessment and systematic design of instruction? Again, from these results the answer appears to be yes. Can online learning be implemented in such a way that faculty report that the experience of developing and teaching an online course will allow them to reflect on and improve the way they teach in the classroom. Once again, these results suggest that it can.

Discovering that 91% of 255 online faculty teaching in areas as diverse as Math, Science, Humanities, Business, Professional Development, Art, and Social Science feel that the online environment is appropriate for teaching their course content may be encouraging to institutions just now considering whether and how to implement online education.

For those just getting started who share concerns about the possibility of achieving high levels of interaction online, it may be useful to know that many experienced online instructors feel that they see more interaction both with and between their students than they do in the classroom. For those concerned about the performance of online students it may be encouraging to learn that many experienced online instructors feel that their online student perform as well or better than their classroom students.

For those who are concerned about whether faculty may see professional development benefits from online teaching, it is comforting to know that 97% of our online faculty reported that the experience helped them to better understand teaching with technology.

It is helpful for us to understand that concerns about anonymity and isolation are not unfounded. We have discovered that it may be wise to focus more efforts on finding ways to help faculty to get to know their online students and we will continue to work in this area.

While this information may be useful, it is necessary to admit that much more work remains to be done. Follow-up research with these faculty, in which classroom based instruction is monitored to see if a carry-over effect actually does exist will be necessary. Will faculty actually engage in more systematic design of instruction, and use appropriate alternative means of instruction and assessment in the classroom? This remains to be seen.

It would be foolhardy (and factually inaccurate) to claim that the positive results reported here, were or can be obtained without trial and error. But certainly there are lessons that can be learned, and some mistakes that can be avoided, based on the experiences of faculty, academic support staff, and the administration of the SUNY Learning Network. Here are a few - which will be expanded upon in the presentation.

In general:

- To assure a consistent interface for student orientation, ease of use, and "ease of support", a flexible, customizable course template is essential.
- Good online instructional practices are independent of software, but not independent of course design.
- In online learning, as in life - just because you can do something doesn't mean you should.
- A well designed course creatively leverages the options and recognizes the limitations of the online learning environment.

- Just because you are teaching your course online does not mean that all learning activities need to occur online.
- Online learning and/or web enhanced learning does not and should not mean self-paced and "instructor-less".
- When it comes to creating your initial course, first make it work, then make it pretty.
- Faculty need to understand the nature of the online environment - this will represent a departure from years of experience and is potentially uncomfortable. Sensitivity to this discomfort is crucial for success.
- Faculty must convert instruction, rather than to try to duplicate the classroom online. Conversion requires "rethinking" how to achieve learning objectives and how to assess online learning within the options and limitations of the new learning environment
- It is critical to create opportunities for interaction with students and between students
- It is critical to create and use activities that build a sense of class community
- Use the structure of the course to convey information about the course, content, tasks, scope and timeframe
- Provide explicit instructions, cues, and signposts for students
- Be consistent, redundant, and complete in the structure and creation of your course - complete design and implementation of a course before it is taught allows for greater flexibility while teaching.
- Faculty must create and communicate to the students a reasonable set of expectations for the levels and kinds of interaction, including boundaries required to maintain sanity.
- Keep it simple, computer skill level should not be a barrier to online learning. Consistency of interface allows for diversity of content.
- Successful online teaching and learning is not primarily about technology - it is about people and relationships. Success demands responsive, caring, and understanding, faculty and student support.
- Learner centered online education cannot arise from trainer-centered faculty training, helpdesk-centered faculty support or instructional-designer centered instructional design.

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GEORGIA TECH MSME ONLINE PROGRAM

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1. Introduction

Georgia Tech is currently developing twenty-two three-semester-credit-hour courses, to be delivered in an asynchronous mode via the Internet, which will allow remote students to earn a Master of Science in Mechanical Engineering (MSME) degree completely online. The goal of the program is to allow distant students to obtain a Master's degree in Mechanical Engineering (10 three-credit-hour semester courses required) online in an asynchronous mode with a number of course options. To our knowledge, this would make Georgia Tech the first and only institution in the world to offer the complete MSME degree online.

2. Approach

During the fall 1999 and spring 2000 semesters Georgia Tech used state funds to produce the first four online graduate-level credit courses in Mechanical Engineering: Manufacturing Processes and Systems; Linear Control Systems; Applications of Thermodynamics; and, Vibration of Mechanical Systems. Using additional funding from the state of Georgia, the Georgia Tech Foundation, and the Alfred P. Sloan Foundation, Tech's Woodruff School of Mechanical Engineering, the School of Mathematics, and the Center for Distance Learning (CDL) are placing another 18 courses online over the next three academic years (see "Roll-Out" Plan below).

Program Innovations in Online Delivery

A number of US institutions of higher education have recently introduced degree programs available for delivery via the Internet. Essentially, the innovators in the field have taken "off-the-shelf" existing video footage, digitized and encoded it, and placed it on a streaming video server. Our experience with previous online courses indicates that this approach produces less than satisfactory results in the mind of the end-user (student). Video designed and produced for delivery on VHS tapes or via satellite does not result in high quality instructional material when digitized and compressed for delivery over a 28.8kbs dial-up modem.

In contrast, the Georgia Tech MSME online program is producing courses designed with delivery via the Internet in mind. For example, whenever possible and appropriate, faculty use the full capabilities of the WebCT software for student/faculty and student/student interaction. Tech expects the capabilities of WebCT to increase both these interactions. Based on past experience, this will occur if faculty strongly encourage or require interaction. In some cases, online classes have a graduate assistant to help facilitate this interaction.

Where possible and appropriate, faculty use other techniques to take full advantage of the capability of the web:

- provide branching within the lecture to other web sites, either on a Georgia Tech server or elsewhere;
- provide graphs and pictures that further explain a concept they present in the lectures;
- require students to access the Georgia Tech computer network either over the Internet or by modem over a phone line to do simulations of their own (this capability is already in place for our video-based students);
- use animations, simulations, and electronic case studies in their presentations;
- use the bulletin board and threaded discussion capabilities of WebCT;
- encourage student/student and student/faculty interaction using the chat room capabilities of WebCT;
- use specialized studio equipment and capabilities, such as "Chromakey" and "SmartBoard" to add production value to the lectures.

In addition to these web-based innovations, Georgia Tech faculty segment course content into modules, which greatly increases the flexibility of course design. This module approach allows for more branching and redirection of content within the structure of the course and facilitates more economical revisions of the content. Georgia Tech also plans to use some of the modules of each course to offer non-credit certificate programs and continuing education programs online.

Administrative interactions between the online students and the Center for Distance Learning occur electronically. Faculty post homework and solutions on the web using the WebCT software. As in our video-based program, approved proctors assure that the person taking the exam is the enrolled student. Faculty post grades and other student information on the web with access restricted by student account number and password.

Working with an instructional designer in the Georgia Center for Effective Teaching and Learning, faculty develop course objectives and a course syllabus, and prepare electronic slides for each lecture. Some faculty find it more convenient to develop their own slides and some want to provide the Center for Distance Learning with hand-written material for creation of their electronic slides. The faculty member's department or school may use some of the \$105 per semester credit hour it earns in online courses to pay for a teaching assistant to help with the above when the online class size is large.

After faculty organize each course and prepare electronic materials, the Center for Distance Learning tapes each lecture in one of its studios using its full capabilities to enhance video and audio for presentation over the Internet. Since delivery over the Internet at 28.8kbps greatly limits the quality of the streaming video and audio (especially the video), the Center digitally compresses each lecture at multiple rates to allow the server to stream data at rates higher than 28.8kbps for those students who have greater bandwidth access to the Internet.

The Center creates an electronic table of contents for the lecture and synchronizes each lecture with web pages containing copies of all notes or materials the instructor uses in the lecture. The Center then converts and synchronizes PowerPoint slides and/or GIF images of overheads or whiteboard with the streaming video/audio. Finally, the Center places the digitized lecture and all electronic materials on servers in the Georgia Tech Office of Instructional Technology for delivery over the Internet. User account numbers and passwords restrict access to the files to students who register for the course.

The software selected for streaming the video and audio is RealServer G2 by RealNetworks and the course presentation and administrative software is WebCT. Georgia Tech has an institutional license for both software products. The state of Georgia uses the same in its Desktop Distance Learning Network. Thus, all courses Tech offers in the MSME program have the same "look and feel" as other Internet courses that other schools in the University System of Georgia offer. Students registering for any of these courses online quickly become familiar with how to navigate through the course.

Georgia Tech is currently recording videotapes in a classroom studio where we can maintain accurate light and audio levels. In some classes, campus students are present in the studio during taping. However, our long-term goal is to record each lecture in a controlled environment in which campus students are not present. In such an environment faculty will be able to focus completely on the presentation of their materials to online students with little or no in-classroom distractions.

The Center for Distance Learning provides support to students enrolled in the MSME program with the same quality provided to students in its traditional videotape-based program. Georgia Tech believes that successful online programs require both high-quality presentations and outstanding services for the distant student.

"Roll-Out" Plan

Georgia Tech offers 38 courses in its videotape-based MSME degree program, from which we will select courses for offering in our new online MSME degree program. We offered the first two courses in the MSME online program during the fall 1999 semester and two more courses during the spring 2000 semester. We will develop and offer an additional 18 courses over three academic years.

Georgia Tech plans to offer MSME courses during semesters in which the professor is delivering the course on campus and through the videotape-based program. Student admission, matriculation, course and graduation requirements are identical to those for campus students. Tech makes no distinction on a transcript or on the diploma that a student was enrolled in the Georgia distance learning program. Distant students enjoy all of the rights and benefits of Georgia Tech campus students and must meet all the same standards.

We plan to place additional courses online for the MSME program using funds generated by the enrollments in the 22 courses developed in this program.

3. Assessment

Georgia Tech’s Director of the Assessment Office assisted in the development and implementation of an effective evaluation and improvement plan for this program. We are fortunate in having three cohorts for each course offered online: the online students, the videotape-based students, and the campus students. We are using all three groups in the evaluation process. We anticipate encouraging some campus students to take the courses online, thus providing an additional perspective on the program.

Over the past eight years Georgia Tech’s videotape-based program has used a “during-term” feedback mechanism for its students and a more extensive “end-of-term” evaluation. We consistently use this input to make improvements to the program and inform our students about these changes. Therefore, we enter the online distance education arena with a wealth of experiential knowledge of what works and what does not.

4. Financial Plan

Expenditures: The development of the first two courses was funded with FY 99 funds. Table 1 shows the itemized cost for each task in the program for FY 2000, 2001 and 2002. We anticipate the total cost of the project over these three fiscal years to be approximately \$670,000. Leveraged funding should allow Georgia Tech to complete the total project in three years.

Table 1

Expenses for 20 Course Program		Total Cost
		20 Courses
Item	Cost	3 Years
Faculty Support	\$10,000 per course	\$200,000
Instructional Design	3,000 per course	\$60,000
Videotaping + editing	4,000 per course	\$80,000
Digitizing/encoding/synchronizing	3,000 per course	\$60,000
Subtotal	\$20,000 per course	\$400,000
Marketing		65,000
Program management	60,000 per year	180,000
Subtotal		\$645,000
Project Evaluation		25,000
Grand Total		\$670,000

Table 2 shows the yearly distribution of funding among the three participating agencies.

Table 2

Distribution of Funding Sources

Funding Unit	1999 – 2000	2000 - 2001	2001 - 2002	Totals
Georgia Tech	\$60,000	\$60,000	\$60,000	\$180,000
State of Georgia	140,000	100,000	100,000	340,000
Sloan Foundation	40,000	70,000	40,000	150,000
TOTALS	\$240,000	\$230,000	\$200,000	\$670,000

Table 3 gives the distribution of expenses by year. As shown in Table 1, the cost of professorial release time, instructional design, taping, digitizing, encoding and synchronizing the slides with the audio/video is \$20,000/course. We expect program management costs to be constant each year. Marketing costs are higher in the first year to create awareness of the program. We are including the ME online program in all marketing of the Tech video-based distance learning program at no additional cost to this program. Project evaluation costs are higher in the first two years reflecting the costs of developing and implementing the evaluation tools.

Table 3

Expenses By Year

	1999 - 2000	2000 – 2001	2001 - 2002	Totals
New Courses Developed	7	7	6	20
Cost	\$140,000	\$140,000	\$120,000	\$400,000
Program Management	60,000	60,000	60,000	180,000
Marketing	30,000	20,000	15,000	65,000
Project Evaluation	10,000	10,000	5,000	25,000
Totals	\$240,000	\$230,000	\$200,000	\$670,000

Income: during AY 2003 and beyond, we expect to offer fifteen courses each year with a minimum online enrollment of eight in each course, yielding a minimum of 120 course enrollments per year.

Georgia Tech currently charges tuition of \$530/semester hour for its online courses, the same as for our videotape-based courses. The total fee for a three-semester-hour course is \$1590. Of this amount the Center for Distance Learning uses approximately \$1020 to cover direct costs including a transfer of funds to the offering academic unit and management and marketing costs. The Center will use the remaining \$510/enrollment to develop additional online courses.

One hundred and twenty enrollments in three-semester-hour courses yields approximately \$184,000 at the current tuition level. Of this amount the Center will use approximately \$123,000 to pay the direct costs of the program and \$61,000 for additional online course development. This will permit Georgia Tech to place approximately three additional courses online each year after the end of this project. A variety of factors, including course demand, competition, and increases in operating expenses, will determine future tuition charges/semester hour beyond the current AY for these online courses.

5. Conclusion

The MSME degree program is the first in a series of graduate degrees Georgia Tech plans to develop and offer the next several years. Current plans call for the development and online delivery of Master's degrees in Electrical Engineering and in Environmental Engineering. In partnership with one of our

University System of Georgia sister schools, Georgia Tech also plans to develop and deliver a Systems Engineering/Software Engineering degree in the near future. Over the longer term Georgia Tech will explore additional online degrees, such as a Master's degree in Engineering Management.

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DISTANCE EDUCATION FOR PRACTITIONERS

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Introduction

As new and continuing educators are faced with changing roles in connected classrooms and technology-based environments, innovative forms of professional development are needed to assure that educators gain confidence and competence with required technology. There are numerous competing issues that add complexity to the planning of professional development opportunities (Lieberman, 1988; Little & McLaughlin, 1993). These include year-round school schedules, limited access to technology, inadequate facilities and support services, lack of time and money, conflicting demands on educators, newly identified educational technology competencies, lack of appropriate reward systems, time management, and balancing of personal with professional goals. This paper provides a look at strategies developed in a successful case study in which innovative measures were used to address issues and to overcome obstacles to professional development. Delivery of the professional development involved distance learning and communication tools.

In response to a statewide initiative to provide teacher professional development in the use of technology in the classroom that focuses on improving the quality of teacher instruction and the level of student learning in the classroom, a partnership was formed. Improving Learning for All Students through Technology (ILAST) is a partnership of California State University San Marcos with North County Professional Development Federation, California Technology Assistance Project (CTAP), San Diego County Office of Education, and over 22 school districts in Southern California. This collaboration provides supportive resources, materials, expertise, information and most importantly the channels for communication among ILAST partners.

A Model for Learning and Teaching

The ILAST partnership promotes field-based and self-directed learning as essential elements of professional growth. This yearlong program provides customized instruction to 455 teachers and administrators to promote effective use of technology for teaching and learning related to new competencies required in California and nationally. „When teachers are learning to integrate technology into their classrooms, the most important staff-development features include opportunities to explore, reflect, collaborate with peers, work on authentic learning tasks, and engage in hands-on, active learning” (Sandholtz et al., 1997, p. 142). Face-to-face regional institutes offer an opportunity to build community and prepare participants for the use of tools which support their professional growth throughout the year. The curriculum is rich in project-based activities and customized instruction in a timeline that addresses year-round and conflicting calendars. The scheduling of institutes at district offices and training facilities assures participants access to local technologies and support systems. At the culmination of each face-to-face institute, participants are guided through the process of developing a Professional Growth Action Plan in which they self-determine appropriate professional growth activities, an anticipated timeline, and a method for accountability for completing a total of 120 hours. Participants select their preferred learning experiences and determine the necessary supports to actualize their plan. The action plan serves as a process for projection, documentation, reflection and self-evaluation. Their customized action plan is completed using distance education and is supported through electronic communication with an ILAST instructor.

Theoretical Foundations

Professional development has taken a series of directions over the years and includes such descriptions as that given by Martin Freedman twenty-seven years ago when he wrote:

By development I mean a heightening of self-awareness, an increase of autonomy, and a broadening perspective on the world. My concern is that faculty better understand themselves and their social and organizational situation, and my hope is that such knowledge will make them better teachers, better researchers, better educators generally” (p. ix).

At this same time, Norbert Ralph (1973) wrote, „Development means dealing with experience in increasingly sophisticated and complex ways and being able to integrate this complexity into stable structures” (p. 62). These words resonate today as we confront the growing complexities imposed by technology on our institutions and on our society. Identifying technology competencies for teachers is a complex issue. When aiming at a moving target, such as determining professional educational technology standards, it helps to apply frameworks such as Roger’s (1995). According to this model on the diffusion of innovations, individuals and organizations adopt innovations at varying rates and play different roles in the adoption process. These roles include innovators, early adopters, laggards, change agents, and opinion leaders. Exploring the needs and expectations of each role helps us understand why faculty use or resist technology and what technical supports they each will need for their own professional growth.

Technology Learning Support Features

„To help teachers incorporate technology in ways that support powerful instruction requires an array of professional development experiences quite different from traditional workshops and how-to training sessions” (Fisher, Dwyer, & Yocam, p. 238). In its use of technology for professional development, the ILAST partnership approaches technology thematically as content to be taught, as a tool to support learning and instruction, as a tool for personal productivity, as a prompt to promote creativity, as a means for multimedia delivery, and as a device for communication. These themes resonate throughout the varied professional growth activities which are designed to implement the standards-based curriculum. Participants choose from a variety of activities including multi-point room videoconferences, online coursework, assistance within classrooms from mentors, desktop videoconferencing, access to an online library of staff development and teacher online resources, and chat groups, bulletin boards and preview of professional materials to enable collaboration and exchange of resources. Through these options, ILAST uses distance education technology tools to accommodate individual learning styles and competing pressures of professional and personal schedules.

ILAST has capitalized on the ability to apply multiple means of communication to provide professional growth opportunities. "Professional development opportunities can be productive in enabling teachers to change the way they work: by building new structures; by working on new tasks; and by creating a culture of inquiry, wherein professional learning is expected, sought after, and an ongoing part of teaching and school life" (Lieberman, 1995, p. 593). Asynchronous scheduling has contributed flexibility and opportunities for customized choices. Participants can choose to complete their planned activities in a schedule that accommodates their individual needs and preferences. For instance, a teacher who feels he/she needs to plan times during the year to completely depart from the rigorous teaching and learning environment, can choose to participate online in the evenings only and schedule a time line of a half-hour per day in the morning or evening. Another teacher who chooses to completely focus on their teaching and students during the week and would like to plan a segment of each weekend or off-track time to participate in professional growth opportunities can create a schedule that accommodates this need.

The array of information technologies in recent years have increased our capacity for scholarly access to professional materials. It has also provided the means for creating, organizing, storing, and accessing lesson plans from a variety of sites simultaneously. What better way to introduce new technologies to support teaching and learning than to utilize and model their use in professional development opportunities. To support the ILAST community and to promote reflective practice, a communicative online hub has been created. This innovative online environment provides personal contacts with instructors, mentors, experts and colleagues. It connects participants and partners to online resources, curriculum for instruction, calendar of activities, contact information, online discussion groups, online coursework, and communication links to university and county office experts.

Videoconferencing

„Using real-time interaction through computer text-chat or videoconferencing programs create a "telepresence" between students and other people around the world" (Harris, 1998, p. 8).

As we incorporate emerging technologies such as videoconferencing into professional development, we are confronting perceived obstacles. While there seems to be general consensus that technology has the potential to revolutionize educational practice, it is yet unclear as to how far the revolution has advanced. Thus far, it appears that most teachers use technology to supplement traditional instruction, not to transform the instructional process (Hayden, 1999). Consequently, many format models for videoconferencing have used the "talking head" remote lecture format. If this has frequently been proven to be less effective than face-to-face classroom experiences, then why use the medium and what might we substitute? The ILAST leadership team sought ways to use this medium and transcend traditional approaches to instruction thus modeling constructivist theory. In promoting the use of technology for teaching and learning, we also want to promote good instructional practice. For example, prior to popular interest in technology, interest evolved around how student learning might be improved beyond delivery-type lecture classes. Techniques for peer interaction and learner-teacher interaction were promoted to get students more actively engaged. Yet with the introduction of technology into the lecture hall, it was not used to promote this interactive engagement, but rather to enhance the presentation platform (Gandolfo, 1998. P. 37). How might we avoid duplicating methods that emphasize the transfer, acquisition and retaining of knowledge? Based on current research and investigations, interactive sessions provide opportunities for involvement that extends beyond traditional lecture delivery. In ILAST, we are developing strategies to engage distant learners through the use of interactive multi-point videoconferencing. Each videoconference session provides an opportunity to reflect and evaluate the effectiveness of the conference format. Through discussions with ILAST team leaders and listening to participant comments, we are learning how to modify our format and content to best meet program and learner needs.

A question we are exploring is what instructional strategies are best employed through videoconferencing? How might we use the medium to accomplish goals that can best be met through this vehicle. The ILAST videoconference format has evolved into model patterns utilizing best practices and interactive techniques. ILAST participants select appropriate videoconference sessions and sign up for one of four or more locations convenient to them. Experts shared ideas, projects, resources, and provide opportunities for participants to raise questions and respond to content. Sometimes a discussant summarizes key issues, suggests connections, identifies emerging themes and trends, and points out possible areas for future research or concern. Other times, participants break up into groups and reflect on the session with guidance from appointed facilitators. Still other formats call for the use of laptops to explore software appropriate to the topic being presented. Each site then shares their reflections and continues to build knowledge on the topics following presentations but still during the videoconference session.

Additional opportunities are available after the conferences to contact experts, contribute to discussion threads in a bulletin board online, and visit resources posted on the ILAST web page. Issues and topics are derived from the competency-based curriculum for ILAST and participant suggested topics that are valuable to participants' professional growth areas. An example of a topic suggested by ILAST participants was the need to provide information related to the "English Language Learner" population in many of the ILAST schools. A search provided several experts and best practices being implemented in local schools, including ILAST partnership schools. The experts not only shared their experiences and projects, but invited participants to visit their schools and welcomed continued contact through email. In some cases videos provided examples of classroom practice that reflected the topic or discussion being presented.

Online Learning

The use of online courses provides ILAST participants a resource well-suited for their needs. The courses include options for short modules completed in as little as six hours, or complete courses developed as a three unit (thirty to forty hour) course. Participants could choose to apply for course credit through the university partnership. Each participant had unlimited use to the courses offered. Within the community of the online courses, participants could interact with teachers throughout California that were also

involved in the course. As this project enters its second phase, customized courses will be developed to expand the options and opportunities identified in the first year.

Each group of participants that were mentored by an ILAST instructor collaborated through the use of an online threaded discussion using WebCT. This environment offered collaboration beyond the initial face-to-face institutes. Teachers could share their lessons, articles they read, ask questions and reflect on their professional growth. This environment was expanded by the use of a free online tool (Yahoo) set up by an ILAST instructor. This expansion was based on a need to collaborate beyond the initial grouping of ILAST participants.

Assessment and Conclusions

Qualitative and quantitative evaluation data collection tools address the following: impact of the project on technology competencies of participants, achievement of project goals and objectives, capacity building of the project, and validity of project-developed curriculum. An online competency-based assessment tool collected data from all participants three times: at the beginning and end of the Regional Institute, and at the end of the yearlong program. Surveys both online and on paper were implemented for ongoing monitoring of progress. Results of that data will be made available at the conclusion of the project.

The ILAST leadership team believes in the principles of learning-by-doing. We are seeing and hearing evidence that instructional strategies of learning-by-doing impacts teachers' use of technology in their classrooms. Participants are reporting success stories, revised classroom curriculum, shared lesson plans, and the evolution of a community of learners as evidenced through project collaboration.

There are other indicators of success as well. The ILAST partnership was grounded in a comprehensive already existing communication base. The North County Professional Development Federation provided the connective link for all contributing voices. Technology provided an efficient collaborative method for project planning which promoted and modeled close listening, shared decision making, and the means for adaptive, responsive modifications. These same communicative links helped build internal supports and promote teamwork throughout the implementation of the project. This enabled the collaborative development of a comprehensive competency-based curriculum. The ILAST Leadership team modeled the learning-by-doing strategies in their Summit meeting at the beginning of the project. The communication process helped shape the competency-based curriculum that was created, modified and fine-tuned as the first year unfolded.

For ILAST participants, tangible incentives were included. For some, it was a stipend; for others, it was the use of a laptop in their classroom. These incentives increased feelings of accomplishment and extended access to technology. All participants got something out of it. The overall goal was to build a pilot model for effective innovative uses of technology for professional development addressing the obstacles identified. Post-institute responses include, „I am glad I am taking this course. My students will greatly benefit!“ According to our participants, we are well on our way to achieving that goal and are seeking further sources for funding.

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CREATING AN ON-CAMPUS START-UP COMPANY

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Transitioning Students to the Workforce

Learning for the new economy cannot take place by simply adding team-based projects to the classroom and updating curriculum guidelines. The global marketplace demands experience in transcultural communication, conflict resolution, client-based project development, and resourcing beyond current skill levels. Unfortunately, this type of learning does not take place in even innovative classrooms due to faculty responsibility to maintain accreditation standards, a student's right to participate at "passing" levels, and the "support" role of the college. Transitioning, however, can take place within a start-up company sponsored by, yet outside of the college infrastructure.

At West Valley College, in Saratoga California, faculty from the Digital Media and Internet Services Department, with administrative cooperation, developed a company named West Valley Design Group (WVDG). The purpose of the company is to bring contract jobs in-house to be developed by students and mentored by faculty. The impetus for the company was the inability to prepare students to meet industry needs in the traditional classroom. Additionally, IT companies had little time to dedicate to traditional student internships. As such, the idea developed to bring client-based work to WVDG where one faculty member and one student work as the client contact and a production team of students perform the design and development work.

Within WVDG, students work first as apprentices, then as interns. To join the organization, students meet with a faculty team and present a portfolio or a sampling of completed work. Faculty and the student, together, assess the student's strengths and experience to determine placement on a production team. Should a student not qualify at the apprentice level, a pre-apprentice position is available where the student may "shadow" a project and learn from the team. After one or more jobs assigned at the apprentice level, students work as interns where they have the opportunity to interact directly with clients and to manage projects. Student interns are paid, both apprentices and interns maintain the right to show completed projects within their portfolios to potential future employers. Transition to the workplace is greatly enhanced through the combination of learning that takes place in the production team environment and in the commercial work they then present to employers. Rather than showing, as an example, a web site for their family, students interview with employers showing work they created for Yahoo!, WebGain, and non-profit organizations. Students develop confidence working on commercial projects and transition with a good idea of what they will need to do to succeed.

This presentation details how an on-campus start-up company, in any field, can be created in collaboration with a college and yet remain outside of the campus system of curriculum, articulation, and accreditation. Developing a concept and plan, creating an accounting system outside of the general fund, hiring students and faculty, are covered in addition to topics such as non-disclosure agreements, release of liability, and purchasing equipment with funds paid by contracts. Creating WVDG and the past two years of implementation has been an interesting experience, transitioning to a self-funded organization, dealing with students hired away in the middle of a project and others who do not perform, among other aspects of "corporate campus life" will be discussed. A CD-ROM with forms, curriculum, a student tracking database, and lessons-learned will be provided to participants.

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THE CHANGING ROLE OF THE UNIVERSITIES: UNIVERSITIES AND COMPANIES IN THE EMERGING MARKETPLACE OF HIGHER EDUCATION

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Abstract

There is, nowadays, considerable interest on ways to formulate effective strategies and forge collaborative business schemes among universities and companies, in the field of large-scale online higher-education provision. The present paper investigates financial and organizational aspects in the emerging marketplace of the online higher-education domain, as well as internal structure characteristics of the universities and companies. Recent research findings based on empirical data are discussed and are interpreted via a recently proposed organizational growth model, which relates growth rate parameters (based on the actual distributions of company growth rates and university R&D activities over many decades) to characteristics of the organizational structure.

1. Introduction

This paper offers a series of arguments regarding the changing status and organizational model of higher education. It addresses current questions in investigating ways to formulate effective strategies and forge collaborative business schemes among universities and companies, in the field of large-scale online education provision. Financial and organizational aspects as well as internal structure characteristics of both universities and companies are investigated. The internal structure characteristics are investigated via an organizational growth model, which relates growth rate parameters (based on the actual distributions of company growth rates and university R&D activities over many decades) to characteristic parameters of the organization structure.

2. Drivers of change

Two primary drivers, which lead the economic and societal transformations are the globalization process and the revolution in Information Technologies (IT). Globalization is not an inexorable process. There is an economic advantage in business expansion, as it leads to lower costs (fixed costs, transaction costs) and increased productivity (via new technologies, corporate restructuring, and market control). Corporate expansion, which occurred prominently after WWII, increased dramatically on a global scale, with numerous divisions, subsidiaries, and regional headquarters (evident by the late 1960s), and mergers and acquisitions across borders (by the 1980s). Corporate globalization then moved to the “networked” phase of “global supply chains” and other “value chains”. This global nexus of producers, suppliers, and subcontractors was already forcing the reconsideration of national economic policies and regulatory apparatuses, pushing toward “liberalization” and “state deregulation”.

The second driver, the “IT Revolution”, intensified the urge and accelerated the process of globalization. Global “reach” and “speed” in business and mass communication became catalysts pushing toward the completion of the globalization process [1]. Supportive information technologies, such as distributed storage networks, streaming technologies, multicasting web conferencing, voice-over-IP, etc., added aesthetic, marketing, and perceptual-learning dimensions to the process, thus rendering the global expansion both desirable and inevitable. The effects on productivity growth and the decline of transaction costs within and across corporations and international markets were and continue to be significant.

Two additional drivers are the deregulation at the national level and the global disintermediation. Deregulation at the national level signals the strengthening of the entrepreneurial forces (and of markets) and the concomitant weakening of the regulatory forces (and of the “state”). Disintermediation signals the effect of “connectedness” and the new “immediacy of communication”. Its effects (beyond politics and culture) on business disintermediation are high levels of subcontracting, de-bureaucratization of corporations, and the decline of transaction costs, “brick-and-mortar” costs, etc. (corporations had already

began to slowly experiment with different organizational modes – fewer divisions and more subsidiaries.) The explosion in the creation of dot.coms devoted to “networks”, “auctions”, “exchanges”, and “communities is indicative of the process of disintermediation. These very processes also apply to the domain of higher education.

As the economy becomes progressively a knowledge-based economy and the perception grows that “four years” of college education must give way to “forty years” of constant professional development, indeed “lifelong learning”, the relative mismatch between traditional education and corporate and professional skill requirements have provided a strong business incentive to provide services to the higher education domain. The inability of the universities to move faster in bringing about curricular reforms that address better the needs of the New Economy (IT, e-commerce, restructuring of Business degrees, etc.) have also led to exploring alternative solutions within the academic system itself. The following section presents such a case.

3. University limitations in rapidly evolving areas

University limitations in rapidly evolving technology education have been revealed as early as in the 1980s and the continuing rapidity of technology emergence and development in the last decades is proving to be too much for the university system to handle. The reason for that inadequacy is attributed [2] to the very structure of the university system: the strength of the university is based on the quality of its faculty and in order to build and maintain a top-notch faculty universities have a tenure system to guarantee job security. A faculty member usually stays at a university throughout his/her career, that is, about 30 years. However, in the last few decades, technology development has progressed at a rate of a significant change occurring about every 5 years.

This discrepancy underlies the difficulty of universities in maintaining teaching standards in the face of technological change. The universities were able to respond well in the two to three decades after WWII because that period of time was characterized by rapid growth in the demand of university education and thus rapid growth in the universities and their faculties. New faculty members were selected to fill the needs of the new technologies in both teaching and research. However, in the early 1980s, a process of saturation in both student demand and faculty demand started that has persisted into the 1990s and is projected to continue into the 21st century. This means that the university method of tying together research and teaching is hardly adequate if the teaching of new technologies is to be done by existing faculty (a choice that might most probably lead to mediocre teaching at best.)

The need to address such problems has led to the exploration of alternative solutions within the academic system itself. For example, in the field of accelerators and beams, one of today’s fast changing technologies, an alternative method was initiated in 1987, namely the US Particle Accelerator School (USPAS) “pulsed education method”, a type of “distance” education offering credit courses (held in a university format,) with multiple courses in parallel, compressing the courses into two-week programs (held at leading universities across the country twice per year), and offering a Master’s degree with Indiana University, which can be earned by accumulating credit through USPAS courses at various universities [2].

4. University growth limitations due to their internal structure

The limitations of the university structure can also be seen in the results of an empirical analysis of the growth dynamics of the university research activities [3] and in the results of theoretical models of firm growth such as the one recently proposed [4] on the dynamics of a system composed of interacting units (each with a complex internal structure comprising many subunits.) In the former approach, V. Plerou and her collaborators have sought to quantify and analyze university research activities and compare their growth dynamics with those of business firms. Their study involves the analysis of 5 distinct databases, the largest of which is a National Science Foundation database of the R&D expenditures in science and engineering of 719 US universities for the 17-year period 1979-1995.

It has been found that the distribution of growth rates displays a “universal” form that does not depend on the size of the university or on the measure of size used, and that the width of this distribution decays with size as a power law. These findings are quantitatively similar to those independently uncovered for

business firms [5-8], and consistent with the hypothesis that the growth dynamics of complex organizations may be governed by universal mechanisms.

The analysis of the R&D expenditures (in science and engineering of 719 US universities for the 17-year period 1979-1995) is performed by school and department by statistically analyzing the annual growth rate, $g(t)=\log[S(t+1)/S(t)]$, where $S(t)$ and $S(t+1)$ are the R&D expenditures of a given university in the years t and $t+1$ respectively. The conditional probability density $p(g|S)$ and the width $\sigma(S)$ of the distribution of growth rates (as a function of S) have been studied. The conditional probability follows a tent-shaped distribution, and the width of the distribution scales as a power law:

$$\sigma(S) \propto S^{-\beta}$$

with $\beta=0.25\pm 0.05$. It should be noted that the same exponent value, β , and the same functional form of $p(g|S)$ is displayed when analyzing another two measures of a university's research activities, namely, the number of papers published each year and the number of patents issued to a university. These findings hold also for the research funding data of two different academic systems, those of English and Canadian universities.

In interpreting these empirical results, it must be noted that they are remarkably similar to the results found by a similar study for firms and countries [5-8]. However, there is one difference: for firms and countries, $\beta\sim 1/6$, while for universities, $\beta\sim 1/4$. This difference can be explained by a recently proposed model of organizational growth [4]. In the model, each organization (university, firm or country) is made up of units. The growth model assumes these units grow through an independent, Gaussian-distributed, random multiplicative process with variance W^2 . Units are absorbed when they become smaller than a «minimum size» (S_{\min}), which is a function of the activity they perform. Units can also give rise to new units if they grow by more than the minimum size for the new unit to form. The model predicts $\beta=W/[2(W+D)]$, where D is the width of the distribution of minimum sizes for the units. For firms, the range of typical sizes is very broad, but, on the other hand, for universities, the range of typical sizes is much narrower, suggesting a small value of D and implying a larger value of β for business firms.

A narrower distribution of “minimum sizes” for the units limits the internal structure “width” with which a university can adjust to the higher levels of educational “load” (both in speed and in extent). If the required change of the size of a university unit is greater than S_{\min} , then a new unit must be created (or, subcontracted). We are nowadays witnessing, this kind of restructuring, which is imposed on the universities from the outside (as a solution to the “traditional” university structure, which induces productivity shortcomings and inefficient support): the traditional functions of the universities are getting unbundled¹.

Traditionally, the universities performed a complete set of tasks on their own: curriculum development, content development, information delivery, mentoring/tutoring, assessment and certification, student support services, procurement and administration (both front-office and back-office operations). These functions are now progressively separated from each other, with some of them becoming preferentially “subcontracted” for fiscal reasons. The trend toward subcontracting and electronic disintermediation (for example of the tutoring, student support, library, bookstore, and procurement functions) is entering its parabolic phase.

An important component of this “unbundling” involves the differentiation and separation of faculty roles. The best models of web-based education, such as that initiated by UNext.com (which will be discussed in the following section), imply the “separation of conception from execution”. This separation at the level of higher education implies the construction of leading courseware by a team of “star-quality experts” and the delivery of the courses by second-tier “tutors” (adjunct professors).

¹ This trend is also supported by recent theoretical works on transaction efficiencies ([9], and references therein), which state that if transaction efficiency for intermediate goods is higher than that of labor, then organizing division of labor between more specialized firms will be more efficient than organizing division of labor within a firm since the former involves more transactions of intermediate goods, while the latter involves more trade in labor.

5. The structure and stratification of the emerging marketplace of higher education.

The restructuring of the corporate sector in the 80s and 90s was noticed with a certain apprehension by several vanguard university leaders. Public ‘flagship’ universities, especially, were worrying about the fiscal effects of liberalization on higher education. Several vanguard university leaders (such as, i.e., James Duderstadt [10]) realized the need for a similar transition of the universities both to a decentralized and subsidiarized form (envisioning the university as a “holding company”) and to a sophisticated “virtual” environment.

The signal that the academic system was out of “sync” was given by the multinational corporations themselves. Disgruntled by the slow pace of change inside the traditional universities and in need of quick and focused education for their employees, they decided to form their own corporate universities. By now, there are in excess of 3,000 corporate universities of uneven sizes and success, producing their own training courses, subcontracting with various educational providers, demanding competencies-based certification rather than mere accreditation, and supporting financially and ideologically an “open shop” policy of higher education. Corporate universities are not currently a direct threat to the academy; but they are a significant power able to shift the power dynamics away from the academy and in the direction of various other entrepreneurial players.

Furthermore, for-profit virtual universities, which are corporate-like entities targeting higher education as their market, have been successfully established. The University of Phoenix (owned by the Apollo Group) is such a for-profit university with both “brick-and-mortar” (more than 85 points of presence and now expanding internationally) as well as “virtual” components. It has grown annually with rates in the 20-30% range and has a current market capitalization in excess of \$2 billion. Jones International University, based in Colorado, is the first fully virtual for-profit university. It is privately held and experiences similar growth patterns with those of the University of Phoenix. Capella University, Kaplan and DeVry are also putting solid roots. But the most talked-about for-profit initiative is UNext.com and its Cardean University subsidiary. Highly capitalized (\$110 million), UNext.com partnering with Columbia, Chicago, Stanford, Carnegie Mellon, and the London School of Economics for the production of a high caliber MBA, is changing higher education at the level of elite institutions. This two-tiered business strategy of the for-profits, in the two most profitable segments of the higher education marketplace (MBA and IT degrees), has produced a lot of turbulence in the academic world. The cost structure of education is suddenly redefined. Elite MBA degrees costing \$80-90K are now facing competition at the \$8-9K and above.

Traditional universities realized at last that they had to initiate the process of their slow and reluctant virtualization. This rear-guard action brought masses of colleges and universities into the process of development of online university divisions. What this really meant was primarily the transcription of their regular courses into web-based courses without any serious change in the ensuing pedagogy. To this day, most of the offerings are anemically marketed, suffering from lack of product differentiation, with insufficient technical and back-office support, and attractive only to a minority of local students.

The inability of traditional colleges and universities to address in a decisive fiscal and organizational way the issues raised by the IT Revolution and the emerging serious competition of the private sector, gave the signal for the growth of a cottage industry of e-learning “dot.coms” (internet enablers, e-learning portals, multimedia producers, training and assessment specialist firms, ‘niche’ content providers, etc.), most prominent of which are eCollege, Quisic (formerly University Access), Pensare, Saba, and Schank’s Cognitive Arts. Hundred of such companies in the last years have received funding from VCs on their way to an IPO. These players are now poised to become strategic partners, allies, subcontractors, consultants, and even outright competitors to the academic world.

A few senior universities opted to establish their own legacy subsidiary for-profit units. What these units represent is an attempt at visionary entrepreneurship, leveraging legacy strengths and matching the competitive challenges of corporate for-profits, and at restructuring the traditional university by their paradigmatic success, technological and pedagogical innovation, and flexible, forward-looking organization and practices.

Many universities have also embarked on initiatives to leverage resources on an international scale through academic alliances and strategic partnerships, including deals with corporations. Fathom.com is moving rapidly in that direction with still uncertain prospects. The U21 group (Universitas21-for the 21st century) is another example, now linked to the News Corporation. Other efforts include a coalition of Commonwealth Universities ("Global University Alliance"), MIT's alliance with Cambridge and Singapore, etc. However, the organizational difficulties (decision making, capitalization) inherent in these forms seem to make them less viable.

Among the bigger players in the field are the publishers, who have started acting as would-be dominant powers. Pearson Plc., the world's largest educational publisher based in London, with 20,000 people working in 50 countries, is the most aggressive. With a market capitalization of over \$15 billion and a number of prominent subsidiaries (Financial Times, FT Knowledge, Macmillan, Simon & Schuster, etc.), Pearson is pursuing a strategy of transformation from book publisher to electronic courseware producer and global educational provider. The recent acquisition of NCS gives Pearson an important 'points of presence' base for testing and certification, fast Internet access, and marketing. Further investments in Blackboard, the emerging platform of choice for online courses, indicate that Pearson is currently executing a business strategy for becoming the undisputed leader in global education.

Thomson, the most serious global competitor of Pearson's, headquartered in Canada, has a market cap of over \$30 billion, of which more than \$10 billion are tied to education. Investments in WebCT provide access to a global platform for online courses. Further investments in Brainbench are meant to solidify Thomson's position in training and to further enhance its dominant role in online assessments and certifications. A strategic partnership with Smarthinking, a Washington-based provider of academic assistance (tutors and 24/7 academic support), positions Thomson for growth in the for-profit virtual education arena.

6. Conclusions

The current state of the online higher-education marketplace, which is characterized by differences in capitalization and overall strategy, comprises:

- publishers (and other big ICT providers) that are infusing into their online education operations capitals in the \$5-20 billion range and leverage them on behalf of global domain dominance,
- corporate-like virtual universities (Phoenix, Jones International, Cardean University), which bring to the market capitals of the order of \$500 million to \$2 billion and they start as virtual producers and providers of degrees,
- Ivy legacy universities, which put into their online initiatives capitals in the range of \$20 to \$100 million, that is, as much as the new "e-learning dot.coms" bring via VC financing, and
- non-Ivy universities, which capitalize their units with something more than zero but less than \$5 million.

The emerging marketplace of higher education thus necessitates rigorous restructuring of the traditional universities, which must leave behind their insular "vertical integration" model and investigate new ways to formulate effective strategies and forge collaborative business schemes.

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THE QUALITY OF HIGHER EDUCATION VIRTUAL EXPERIENCES

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1. Panoramic View of Virtual University Education on a global Scale

1.1 Virtual Universities and E-learning

It is still difficult to give a good definition of what is a Virtual University. That is because, for many reasons, there are numerous higher education institutions trying a variety of teaching methods while using differing degrees of virtualisation in the organisation.

Lately, a new term has begun to be used in an attempt to cover a wider idea and, as usual, there are individual interpretations that establish definitions that are at the very best dubious. All this is based on the English term "e-learning". This can be defined as "the use of technologies based in the Internet that provide a wide variety of solutions that bring together the acquisition of knowledge and abilities or capabilities." (Rosenberg, 2000)

1.2 Degrees of Virtuality in Higher Education

Let us establish an organisational continuum for the analysis of the virtual learning institutions from those we call virtual as a complement to attended sessions through to those that are totally virtual. Whichever existing possible model from this continuum is adopted it will generally be according to the needs that satisfy the identity and development of the university or centre of higher education. Also, it will depend on what the institutions can offer and what technology they use or on the way they use it.

Let us continue by presenting a sketch of the most common categories that we find taking into account the above criteria.

1.2.1 Depending on the type of Initiative

- a) Non virtual university which introduces some virtual aspects to its teaching dynamic
Generally, we are dealing with activities of a precise nature. These activities range from creating teacher tools which merely make it easier for him/her to make his/her own web page, or the creation of a distribution list for students of specific subjects, through to the teaching of determined subjects via environments considered to be virtual or requiring partial attendance (online, videoconferences...). These subjects are normally not obligatory (free choice). As is often the case, this practise does not modify the dynamic of the class significantly, and the evaluation of the class is carried out using standard traditional criteria. Examples: UPF, UPC, and UCM
- b) Non virtual university with a virtual university extension
More and more universities have developed virtual spaces which are separated from the general dynamic of the university organisationally but not legally, and from these they offer university extension courses or continuous education. Often these extensions are a laboratory of virtual organisational experiments that will be introduced into the university collective. Examples: UC Berkeley Extension, Phoenix Online, and CEPADE
- c) Shared space virtual courses offered by attended universities
Attended universities that are offering specific virtual courses decide to share a single space where students using the given technology can access the university's offer. Normally, these experiments take the form of a consortium through which all the involved institutions can participate and in certain cases some of these come from the business or industrial sectors. Examples: California Virtual University, Cardean University (Unext.com), Bayerische Virtuelle Universitat
- d) Virtual university attached to the traditional university
Some traditional universities have created virtual universities in their own setting. They have constructed virtual spaces that are handled independently but have the same basic elements as the traditional university. Many of these schemes carried out have up until now used the same teachers

and/or the same administration as the traditional university although owing to the many problems characterised by this set up some have been forced to create different procedures and teaching staff. Examples: Universidad Virtual del TEC de Monterrey, UNIVIR de la Universidade Carioca, WorldCampus de Penn State University

- e) Virtual university as a virtual organisation
These have been created specifically to be virtual universities. The majority, although not all, come from the range of distant and open universities. They have a different pedagogical and organisational model. Examples: UOC, Capella University, Western Governors University
- f) Communal Inter-university virtual spaces
Here we can find collaboration between universities that have a virtual environment and decide to offer courses of their plan of study to the two university communities. Examples: SVM (Student Virtual Mobility Project) care of Vaxjo University (Sweden), Open University (United Kingdom) and UOC.

1.2.2 Depending on the Offer

On the other hand, we can classify these initiatives depending on the offer relating the offer to its subject matter, the volume of students who take the course or the language used to convey it.

- a) Subject Matter
Historically, and until the creation of the UOC at the end of 1994, higher education institutions that had brought themselves into virtual teaching had concentrated on postgraduate education and on university extension.
Similarly, some universities have developed this practise only in some of their departments. Independently of dealing with homologous qualifications or its own certificates, or with the teaching of the extensions or not, in some cases we find a certain specialisation linked to a specific area of knowledge. Those courses having a economics or business, computing or pedagogic subject matter are the ones which lend themselves best to the virtual world, although in recent years there has been a bigger diversification.
- b) Volume
In Europe 1995, we found two pilot schemes in operation that used a virtual setting as a means for teaching and training¹. Higher education institutes and especially universities have had a tendency to incorporate pilot schemes, normally isolated, offering fewer places. This practice, which is recommendable, especially when the institution is just starting out this new method, has stuck out in several institutions that have lacked a plan of strategy that would have helped their new venture². It was not until 1997 and thereafter that certain universities began to get a glimpse of the huge potential that this type of education could have. These universities considered investing in this field.
In spite of that, many schemes had a considerably low number of participants. On the other hand, the figures derived from America must be treated with circumspection, given that they often refer to the number of times a student has enrolled in a different course as opposed to the total number of students resident in a virtual education system.
In whichever case, we would be able to distinguish between any new institution, those that pursue a specific market (up to 3,000 students approximately), and established institutions that are currently moving between 10,000 and 30,000 students.

1.2.3 Depending on the Distribution Technology (delivery system)

We could establish a distinction between those models that utilise synchrony and asynchrony in a different way.

- a) Mainly synchronous models
The virtual world rests on the fact of being able to overcome the barrier of distance. With reference to the methodology these models do not differ excessively from attendance models, even when there is a difference, obvious in some cases and notable in others.
Often they make use of videoconferencing, chat systems as well as attended sessions where they have conferences, tutorials, etc. Electronic e-mail is usually the most asynchronous system they use. In the

most extreme case and therefore furthest from what is really virtual (according to Rosenberg this would not be e learning) they are based in periodically attended classes with complementary use of ICT.

b) Partially asynchronous models

These are models of transition in institutions that still have some strong reservations about the effectiveness of a completely synchronous model.

They usually set themselves the use as a learning virtual environment that often does not become a true virtual educational community, more accurately put, they become a virtual repository for material and also a platform for announcements.

This space complements itself with some attended sessions, the use of videoconference and chat systems, therefore making a hybrid model with restricted use of the synchronous possibilities.

c) Essentially asynchronous models

They are based on making the maximum use of the potential that virtual learning environments (VLE) have and, on the whole, bring flexibility and interactivity; they permit access to the sources of information and resources found on the Internet, as well as didactic material which is integrated into the virtual environment and is provided by the institutions themselves. It also permits connection to a truly virtual community of learning people (Duart and Sangra, 2000).

2. Quality Parameters in the Educational Virtual Activity

In the university world, the emergency of virtual learning or e learning, instead of appearing as an opportunity to the development and updating of society's needs, is being perceived as a threat to some university institutions.

This fear has generated, as a means of defence, a discourse of doubt towards this type of university education which is sometimes pejorative. This defence mechanism has questioned the quality of e learning at university.

It is obvious that every learning methodology must prove itself useful and positive, and in this sense there already are many initiatives working on establishing the standards for a quality certification of e-learning based projects at a world level.

In this sense, and without intention of being exhaustive, we can name the following:

Web-based Education Commission <http://www.ed.gov/offices/AC/WBEC/FinalReport/>

The United States Congress established this commission with the mandate of developing specific political recommendations directed to maximising Internet education possibilities in the different levels of the North American education system. It is chaired by Senator Bob Kerrey and has produced a report that was brought to the Congress and the USA President in December 2000.

National Education Association <http://www.ihcp.com/quality.pdf> <http://www.nea.org>

The United States National Education Association set forth the Institute of Higher Education Policy that prepared a report on the quality of line education. This report, entitled *Quality On the Line: Benchmarks for Success on Internet-based Distance Education*, was created with the direct participation of six North American higher education institutions: Brevard Community College, Regents College, University of Illinois at Urbana-Champaign, University of Maryland-University College, Utah State University and Weber State University.

The Council of Regional Accrediting Commissions <http://www.msache.org>

It brings together all the North American accrediting agencies. It has produced a document (*Guidelines for the Evaluation of Electronically Offered Degree and Certificate Programs*) which establishes the general principles for evaluating and certifying the programs offered electronically in the United States.

European Network for Quality Assurance in Higher Education (ENQA) <http://www.enqa.net>

It is a net of agencies and equivalent organisations that deal with quality evaluation of higher education. It follows the 98/561/EC Recommendation of the European Union Council of 24/9/98 on European Co-operation on higher education quality assurance. One of its objectives for the biennium 2000-2002 is "Quality assurance and quality assessment of new forms of delivery".

International Council of Distance Education (ICDE) <http://www.icde.org>

It is the biggest organisation of institutions dedicated to distance education. They are present in the five continents and have a very high level of influence. They have decided to establish a new headquarters in Barcelona (Spain) which will specifically deal with virtual distance education. One of its objectives is the creation of a world quality stamp for virtual education.

BENVIC Project <http://www.benvic.odl.org>

The Benchmarking of Virtual Campuses is a project partially sponsored by the European Commission. It is establishing an assessment system for virtual campuses via a process of benchmarking. The first phase has been very positive and a second phase has been approved. In this second phase new European and American institutions have joined. The University College from London, Abo Akademy/University of Turku from Finland, FIM Psychology from Erlangen (Germany), the UOC (Spain), the Tavistock Institute (United Kingdom) and Scierter (Italy), all of these institutions are participating as well as the European Conference of Rectors (ECR).

In addition, it is worth mentioning the following institutions which are now not relevantly contributing to quality measurement but will very likely play an important role in this field in the coming years.

E-University <http://www.hefce.ac.uk/Partners/euniv>

E-University is a British Government initiative that promotes a completely virtual worldwide university. The project is being developed independently of existing universities, although it is anticipated that it will act as a spur to their evolution.

Unext.com <http://www.unext.com> http://www.unext.com/products_services/services.html

This is a consortium of universities, among which there are Carnegie Mellon, Stanford University, Columbia Business School, University of Chicago Graduate School of Business and the London School of Economics which provides courses throughout the world which are mainly business finance and administration courses. As an education operator it has created the Cardean University.

Corporate Universities <http://www.corpu.com>

The figure of co-operative universities, linked to specific companies usually multinationals, is emerging with force in the world of education. With huge economic resources and it is still to be seen in what way they can contribute to the quality of virtual education.

3. Quality Criteria in Virtual Universities

All previously mentioned references agree on some criteria as to the indicators of quality and disagree upon others.

If we take universities specifically created to be virtual as a standpoint, the quality parameters should consider the particular characteristics of this type of university and could consider the following criteria:

3.1 Criteria related to the Education Offer

Here the study plans and learning activities offer has to be taken into account; also their appropriateness in relation to the social and labour market needs of the population segment to which the university is

directed. At the same time an education offer including university extension and third courses could be considered.

3.2 Criteria Related to Organisation and Technology

The organisation and technology which is available to the student should be looked at and the university objectives and attainments as well. It should also be considered whether there is a stable enough technological platform that guarantees communication among all the members of the university community.

3.3 Criteria related to the Materials

As for studying materials, the criteria should refer to the quality of their content and the adaptation of their design to a virtual education environment, which is not physically attended. The existence of libraries should also be checked, and the access to other resources which ensure a high level of study.

3.4 Criteria related to the Teaching

Guarantees on the selection process and the evaluation of teachers would be a key aspect of this section, also the existence of a learning support system that would make studying flexible; planned and continuous help, the required feedback for students to be able to adequately control their studying process and rigorous and clear accreditation system.

3.5 Criteria Related to Knowledge Creation

Finally, as for the creation of knowledge, the existence of structures that permit research in the university itself and collaboration with other universities, institutions and companies should be taken into consideration. At the same time the presence of the University in the scientific and specialised fields where it carries out research and diffusion of its results should be analysed.

4. Conclusions

In spite of the fact that the quality parameterisation mechanisms vary according to the context (Tait, 1997), up until now it can be affirmed that two tendencies, in relation to the quality assessment practice of the institutions that teach virtually, have started to emerge.

4.1 As an Complementary Activity to Attendance

Virtual education is considered as an appendix to attended education, without which it has no substance; it also needs to be evaluated in the same way as traditional attended education. Obviously, this tendency is losing followers as the virtual offers of education are systematically spreading.

4.2 As an Education Activity on its Own

The search for specific indicators and criteria that answer the following question has been put in motion. The question is how to assess the quality of education directed at people with differing profiles from the traditional student's and is taking place in a specific environment with given resources.

Often the focus is only partial and we can find mechanisms to evaluate the teaching activities, the quality of material, the technological platforms and students' satisfaction.

The approaches of a more global nature are currently divided into two main tendencies:

- a) The quality assessment methods centred in standard quality models (TQM, EFQM.)
- b) The methods that are based on the art of benchmarking provide tools and suggestion for improving the whole set up by observing, comparing and co-operating against what is thought to be good practice. Following this we find the "Guidelines" by the Council of Regional Accredited Commissions of the United States or the "benvic" project of the European Commission.

In any case, the journey has but only started. Time and research will tell us if e learning becomes a quality learning method, comparable or superior to attended traditional education.

However, what cannot be denied is that a wider range of opportunities is opening up in front of us. We should not let fear of failure limit us. As the Czech politician and man of literature Vaclav Havel has said, "We live in an era where everything is possible and nothing is certain to happen".

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COPYRIGHT: THE REAL BARRIER TO DISTANCE EDUCATION IN THE MODERN AGE

Richard Niven, The Open Polytechnic of New Zealand

Why we must teach over the Internet.

The modern age of distance education is internet delivery.

Our students in 10 years are 9 years old today. They have been using computers for 3 years already and are comfortable with them. Seeking higher education they will:

1. Not want to receive print material
2. Be used to absorbing and analysing large amounts of text from a computer screen
3. Expect to deal solely with all suppliers over the net

As professional distance educators our teaching material fits well into the electronic environment. We do not try putting live lectures over the net or dumping the text of those lectures onto a site with a picture or two and call it an online course.

We own the copyright of our teaching material. We need to protect our copyright in our material. The truth is that the risk to our material for print delivery is essentially the same when we deliver over the net. We need not worry.

The real problem;

Our real problem is that we have is readings. Like all places of higher learning we all have a well-developed and resourced library with highly skilled information professionals. As distance educators the problem is that our students do are not on campus. They cannot walk in and borrow a work or exercise their "fair use" rights by making a photocopy of some of the work. To effectively teach our distance students over the net we must provide access to readings. But How?

Lend copies of the originals.

This creates no copyright problems but is a practical impossibility because of the tyranny of distance. We would not risk hard copy originals to the postal system.

Send the students to their local library.

Only a very small percentage of suitable works will be available at a local library. Certainly there will be no consistency. Also for many of our students the library will be a long boat, camel or walking journey away.

E-journals.

This is a good possibility. In today's world of tight library budgets and rising journal subscription costs, our libraries are increasingly relying on amalgamators of journals. Ebsco¹ and Bell and Howell's Proquest² are but two. You of course have to pay for the access. Payment is not really the problem as long as it is reasonable.

¹ <http://www.epnet.com/>

² <http://www.umi.com/proquest/>

The problem with e-journals is that not all are yet available electronically. What can we do? Wait, it will happen.

E-books

These sound like the answer to all our problems.

The netLibrary³ e-books offer 30,000 titles and 100's of new titles are scanned and becoming available each day. However the first problem is that for our courses we found not one of the e-books were used as readings for our courses. Why? There are just millions of books used in the academic fields and it will take a few more years for the e-book service to cover enough to be a substitute. Also the titles chosen have an American bias. (Have you heard that before?)

Lastly, e-books are only a substitute for books you would lend. If you "buy" one e-book, only one copy can be made available at one time. OK for background research but no use for required reading.

Reproduction Rights Organisation licences.

If we are in the United States we can use Copyright Clearance Centre⁴ to buy rights to electronic delivery of print material. However to pay the rates advertised books the cost is going to be horrific. An estimate of the total pages we send out per year is 12 million. The average of the CCC advertised rates including, their admin charge, is .15 US cents per page.

Changing from all print to all electronic delivery under a CCC licence would cost 1.8m USD as opposed to a current fee of nearer 12,000 USD. There is a difference.

A digital licence may be available from UK RRO's on a trial basis but at a rate (by my guess, not through any negotiation) of .08 US cents per page. So for UK publishers our cost would be half but still impossible.

The Law. Fair Use

Existing law may be helpful. When countries have put the WIPO⁵ (World Intellectual Property Organisation) treaty into their law copying generally was made technology independent. A photocopy or printed copy is the same as an e-mailed copy.

I note with interest that modern photocopiers actually scan, create a digital image and then print. The e-copy is not stored for any significant time but it exists. The copying that occurs over the net is no different in legal principle from photocopying.

Many countries permit education institutions or their libraries to make a copy of a reasonable proportion of a work for a user. All legislation has some form of fair use provision.

Personal fair use permits an individual to make a copy of (part) of a work for their own study or research. The amount permitted depends on the specific legislation. In many cases the interpretation of the treaty provisions is similar and means that the amount able to be copied depends on a balancing of a number of factors. A practical rule of thumb is in the region of one article, one chapter or 10% as long as it is not the "essence" of the work.⁶

This is not much help for distance educators where there is a need to put together a collection of readings for the benefit of students and the student can not attend the campus library and make a copy of the recommended readings using the students own fair use rights.

³ http://www.netlibrary.com/aboutus_index_info.asp

⁴ <http://www.copyright.com/>

⁵ <http://www.wipo.int>

⁶ <http://www.copyright.co.nz/whatcopy.statutory.html>

The Injustice; the tyranny of distance.

This is the “great injustice” for distance educators. We teach at a distance and, while we have library services, the student can’t access the works at a distance and make a copy from a distance. How can we bridge this tyranny of distance invented by short sighted legislators who can only conceive of “contact” institutions?

In New Zealand we can use a couple of provisions of our law where we can make one copy for teaching purposes.⁷ As the law is technologically neutral the copy can be electronic. Then when a student being taught wants to access a reading, they can request our library to make a copy of “a reasonable proportion” of the work and send it to them. This is done automatically using the internet.

It is only available to students and at last puts our students on a level playing field with contact students. This is how the world should be.

However copying of material using electronic means and sending it electronically will cause howls of horror and shock from copyright owners (mainly publishers)!

“Accessing print works digitally will be the end of our way of life as we know it. Everyone will be storing the digital work on their hard drive, printing 100’s of copies and e-mailing it to everyone in the world. We will loose sales. It must be stopped”

What a load of codswallop!! Think about it. How many of our students would even bother to send any of the erudite and arcane readings we give them off to their mates. Just imagine down at the pub or bar. “hey, look at this , I have a copy of a chapter 5 of (insert name of obscure text) I will e-mail you a digital copy , give me 10 euros.”

I can just hear the reply and it would not be “where do you want the money?”

What are the publishers worried about? The legal protection is the same. Adapting, further copying, selling or distributing the material to the public is still illegal. If someone does it to create an economic impact it will be visible and can easily be stopped. There is no difference in law and in risk between using copyright material electronically and using it in the print medium.

It is not the medium, it is the message.

The only difference is that of speed. It is possibly this that has made the publishing dinosaurs so cautious.

But that difference is not new. In the west works were initially in a single copy. Then the intellectual powerhouses of the Monasteries developed the dictation and copy-room production system for the medieval manuscripts. That enabled much greater availability of works but created its own copyright problems. One Abbot (now a saint) was on the receiving end of accusations from another monastery that he had copied the words and the style of their manuscripts.

The speed of reproduction sped up with Gutenberg’s printing, then movable type, then high speed presses, then the gestetner machine and mid last century the photocopier arrived.

All of these new technologies created arguments that the world and the rights of copyright owners would be destroyed. Far from it. Works are more widely read and sold because of modern technology, not in spite of it.

The same is true of the latest on the long line of technologies, the internet. Publishers now cry foul but they are just getting used to something previous generations of publishers and copyright owners had lived through many times before.

⁷ New Zealand Copyright Act 1994, sections 44 and 51

Copying from the internet.

A brief note on the net and pages. Many laws allow a certain “free” percent (or number of pages) multiple educational copying.⁸ What is a page on the net? It can’t be a screen as screens are so different. Changing the font type and size on screen would create an advantage also based on user selection. The size of a page must be selected by the publisher. A miniature bible with pages 20mm by 30 mm has much less copy than the 400mm by 600mm coffee table work.

Applying the same logic to the net, a publisher chooses to have their web page so it will fit on a 670 mm screen means you scroll if you have a 400mm screen. The test is therefore what you can scroll is a page.

A work thus must be everything on a site. The next divisions are similar to chapters and parts. Following this logic a percentage is thus a percent of a site.

<http://web.mit.edu/> a work

<http://web.mit.edu/newsoffice/nr/2001/ocw.html> a page

<http://web.mit.edu/newsoffice/nr/2001/ocw.2html> same page but an internal hyperlink

So if your law permits multiple copying of a page of a published work, the web is published, and the page is what you can scroll. Sometimes it is big, sometimes it’s small, just like print! (again, it is not the medium, it is the message Use the same tests for fair use.

What do we have to do in this brave new world?

All of us must accept that education and copyright is a partnership.

We teach students to be creators of knowledge; much of that knowledge will be intellectual property. We must not teach by disregarding copyright. It would be hypercritical. Acknowledge all sources, copy only what is permitted and if we need to pay, we must pay.

Publishers (who are either the actual copyright owners or have the greatest financial interest in that property), rely on our graduates as their creators of knowledge. That knowledge, and the universal creation of knowledge relies on access to the knowledge that has gone before. Publishers must not prevent reasonable access to copyrighted material in the pursuit of education. Not only would this be hypercritical, it would cut off the hand that feeds them.

Where are we in the use of copyright material in electronic distance education?

Australia

The Copyright Amendment (Digital Agenda) Act 2000⁹ commenced on 4 March 2001. This act ensures that the basic principles of copyright that apply to print originals and copying apply in the digital medium. The Australian practice is limited statutory copying combined with a compulsory statutory licence. The Act defined reasonable proportion in the digital medium. The real problem of temporary copies is resolved by the Act in the only sensible way so that copies made as a necessary consequence of transmission or copying are not additional copies in terms of the Act.

Under some circumstances users of libraries can receive copies of articles in digital form where the library has digitised the article.

Essentially Australia has created a limited pathway for compulsory licence use of digital material for teaching. Whether anyone can make full use of it remains to be seen.

⁸ New Zealand Copyright Act 1994 section 43 British Copyright Designs and Patents Act 1988 S 36

⁹ Within the Australian Copyright Act 1988 http://www.austlii.edu.au/au/legis/cth/consol_act/ca1968133/

The United States

The United States has an advantage of the use of the CCC digital clearance service. Not all works are covered and CCC arranges the digital clearances. The cost is per page and variable depending on the author or publisher. My analysis of the costs show a 500% increase in costs from going from print to Electronic delivery so publishers have not even begun to be realistic on the cost issue. However it is a start.

Distance teaching providers in the US however believe that the existing US fair use provisions discriminate against them and are seeking a law change. The "Technology, Education and Copyright Harmonization"¹⁰ Bill before the 107th congress proposes to permit transmission digitally of literary works and reasonable proportions of other works where the "performance or display is made by or at the direction of an instructor as an integral part of a class session".

The Bill also resolves the intermediate copy problem, a study by the U.S. Copyright Office of the operation of the Act 2 years after the passing of the Act and a conference of all parties at that time. There is also some strong provisions to restrict further use of the material when received by the student.

A new challenge.

MIT have announced that they have a 10-year plan to place all their teaching material on the net.¹¹ It is not a distance teaching initiative. MIT President Charles M. Vest said :

"MIT OpenCourseWare is a bold move that will change the way the Web is used in higher education. With the content posted for all to use, it will provide an extraordinary resource, free of charge, which others can adapt to their own needs. We see it as source material that will support education worldwide, including innovations in the process of teaching and learning itself."

Is this the future?

Europe

Individual countries of Europe have their own iterations of the WIPO treaty but are bound, within the EC, to consider the EC Directives. David Vaver¹² has described them as "the gathering herd of European Union Directives that preambles its way through dozens of "whereases" to a final anticlimactic enclosure of comparatively few sections of operative text". He sees little of substance in the current legal and policy fields to lead to the future.

The current version of the EC copyright Directive has caused some concern with consumer and user groups. For example the European Fair Practices in Copyright Campaign¹³ is of the strong opinion that the Copyright Directive must comply with the eEurope-initiative, which aims at accelerating the uptake of digital technologies across Europe. Clearly the current legal position is not digital friendly.

Dr. Thomas DREIER, M.C.J., Senior researcher at the Max Planck Institute, in his extensive treatise¹⁴ on the German copyright environment (but clearly in the European context) argues for a detailed change to all parts of copyright laws to specifically include digital, on line and multimedia technologies. While very thorough, I see a danger in too much detail because new technologies or innovative use of existing technology could leave all that detail dead.

Dreier does recognise the need to make the educational exception (Sec. 46, German Copyright Act - Collections for Religious, School or Instructional Use), cover digital works.

¹⁰ <http://www.congress.org/congressorg/issues/bills/?billnum=S.487&congress=107>

¹¹ <http://web.mit.edu/newsoffice/nr/2001/ocw-facts.html>

¹² Otago University (New Zealand) Law review 2001 10:1 1-15 "Creating a fair Intellectual property System for the 21st century" Vaver, David (St Peter's College, Oxford)

¹³ <http://www.lansbibliotek.halland.net/hkonf99/ssld013.htm>

¹⁴ http://www.ipa-ue.org/copyright/copyright_pub/dreier.html#a2

Inquiries I made while in London last year indicate that an e-licence was possible with British publishers but at a cost that meant large scale e-teaching was uneconomic. However the flexible response from the publishers gave me hope for the future.

The future depends on a concerted and simultaneous two-pronged strategy.

Strategy 1. Fix the law. Fix it for all media. Fix it simply. Make copyright legislation technology neutral. All we want is to be on the same playing field as content institutions. Registered bona fide students must be able to access reasonable proportions of works electronically. The US initiative is great. It's simple; it protects owner's rights, resolves the intermediate copy problem and has a good mechanism for review. It affirms the partnership between educational institutions and copyright owners/publishers that is vital to us both.

Remember we want nothing new. The WIPO treaty protects the ownership of original works, we must ensure that applies irrespective of what technology created the work. That right includes the right to copy. Copying is the same irrespective of the technology used to copy. That right includes the right to issue the work to the public. The issue to the public is the same irrespective of the media used. The same applies to the right to adapt. It must be a technology neutral right.

The treaty also recognises exceptions to these rights¹⁵ (as copyright is not an absolute right but a compromise of parties rights). One example, universally applied, is the right to make copies of part of a work for educational purposes.

This right must also apply in the digital medium.

Fix the law, only where needed, to take it back to the simple WIPO rights applying already in the print medium.

Strategy 2. Create the content. Look around you. You see some of the best educational brains and most respected higher educational institutions in the World. We all research and advance the greater good. Let us co-operate in all disciplines. Jointly create our readings and reference material. Make it freely available to all partner higher educational institutions at no cost. We will share the refereeing tasks. We can then deliver the future that tomorrow's students will demand.

This will not prevent us publishing the material commercially. We could even jointly publish material. What an opportunity!!

But the real driver is to make good reference material available freely within the world of distance education. We need both strategies as neither will happen immediately and one will help the other.

Call to action

We can lobby, argue and pressure for strategy one. But the power is not all in our hands. For strategy 2 the power is in our hands. Just do it!!

¹⁵ Article 10, WIPO Treaty, adopted December 20 1996 at Geneva

THE LIBRARY AS FACILITATOR IN THE E-LEARNING ENVIRONMENT

Lone Jensen, Aarhus School of Business, Karen Harbo, Aarhus School of Business

The Changing of the Study and Learning Environment at the Institutions of Higher Education

In recent years the study and learning environment at the institutions of higher education has gradually changed its character. The students still follow the conventional courses of lecture, but the responsibility for own learning is constantly increasing, and to a large extent they work problem-based and project-orientated. The students work in groups – teams – something that makes heavy demands on organization and co-operation in order to solve the tasks set, i.e. qualifications that are in demand in the society and in the business community where they are to act professionally. This means that the students need to meet between the lectures. They need to be able to get information and source material for preparing seminars and projects. And in this serious working process they need to have the opportunity to ask for advice and guidance from teachers as well as information specialists: A whole range of physical and intellectual demands on facilitating the study and working process, which is a natural consequence of the modern form of education. The frames set by the classroom and lecture-room education do not suffice. Instead there is a wish for meeting rooms, the facilities of seminar rooms, as well as a generous access to all information resources of the world, both printed and electronic material - and finally - the facility of consulting professionals.

We are here talking about traditional students studying in the daytime at the universities and institutions of higher education. Distance learners and students studying part time have specific needs. Not to speak about the future students of the Virtual University of tomorrow! The two last mentioned groups are students whom we are to meet and to service via the Internet through electronic user interfaces and virtual environments. To support studies and learning of this dimension is an enormous pedagogical task and a challenge to all institutions of higher education. We will come back to this.

The research libraries of today have made serious attempts to live up to the above-mentioned changed study and learning conditions. We have always provided reading desks and access to literature, but many of our institutions have indeed had difficulties satisfying the massive demands from the students on multi-faceted study facilities:

- On one hand silent reading rooms for individual concentration and on the other group rooms for loud discussions and talk.
- Access to printed as well as electronic information resources, the latter requires lots of hardware.
- We also experience an increasing astonishment on part of the students that the Library does not give access to different software that is used in connection with the study, again something that requires lots of hardware.
- And again, should the supervisors not be regular visitors to the Library – in order to guide the students in professional matters?
- Unlimited opening hours and
- Last but not least, a wish for the Library to be a drop-in centre where you can enjoy your packed sandwiches and your coffee, tea or cola. Food for the mind does not suffice – even for intellectual youngsters!

But then, are we not talking about modern laboratories – study and learning labs? Places where facilities for library service, education and breaks melt into a whole.

As already mentioned, the students of today have changed their study behaviour. In this development process of the learning environment it is important to understand the needs and behaviour of the coming students.

The Typology of Students

The typology of the students is changing concurrently with important changes in society and on the labour market. Growth in industry will take place in the service sector and in enterprises of high technology. This makes demands on the staff of the future to be better qualified and consequently to be in a continuous process of training. A typical staff member has six to eight jobs in the course of his or her career and is often appointed on a contractual basis for a limited period of time. It will increase the pressure on the employee as to seek further training in several periods of his or her life. The variation in age, social status and ethnic extraction will be much wider than we know of today. Many people in different environments will be users of the higher education system all through their working lives. To the young people on the educational market it applies that they often are active on the labour market as well, something that contributes to their development and can be a valuable supplement to their studies. To both groups of students these conditions mean that they need access to flexible learning environments.

The coming students will to a still larger extent want to have the options of tailored educational programmes – “just in time – just for me”. Students will change from being passive recipients of learning into being active players who are critical of the learning situation and will consequently contribute to change the performance of the teacher. A new generation is on its way into the system of higher education, called the “Nintendo Generation”, who during their childhood have learned by non-linear methods. A characteristic of this generation is that they take a look at the graphics first and do many things in parallel. They seek interactive and funny learning experiences. If the institutions of higher education shall be able to provide meaningful and relevant educational options, it will be necessary to abandon the expert status of the teacher and to develop an environment where all players exchange ideas and knowledge with one another. The study labs we mentioned above would be an example of how to meet this need.

The educational environment is thus tremendously challenged – and the research libraries are to meet this challenge in order to be an active resource for the students. If you look at status quo in relation to our users, the users of the future can be compared with the group of students who today study as distance learners. These have a range of characteristics that match the students of the future.

In England a major investigation has been carried out of distance learners and their library needs. It shows that distance learners have a heavy demand for library facilities. Often the teachers are not aware of this demand, as they fail to appreciate this part of the students’ learning options. In other words, the teachers are not used to include the information retrieval and the development of the students’ information competence in their planning of the educational programmes.

Distance learners need to be able to draw on the library system as a whole, since often they do not have immediate access to the library on the educational establishment they attend. It is a great task for the libraries to meet these needs and to become visible in the development of the learning environment of the future.

We must realize that the organization that underlies the traditional framework of the library comes from our users in this respect.

Learning Resource Centers and Knowledge Sharing

In the 1990’s new and very beautiful and functional research libraries have been built in Denmark. Everywhere they have tried to take due account of the development, and the results have been fantastic. But we also experience that it can be difficult to anticipate the new demands that emerge.

The demands made by the users on study and learning facilities not only cross the organization of the individual library, but also the organization of the respective educational establishments. A co-operation to solve this task of facilitation is a possibility that is tested at present with the new learning resource centres being established these years by several Danish research libraries.

I September 2000 the Library of the Aarhus School of Business opened such a centre in close co-operation with the Faculty of Modern Languages at the School. Here we have tried to meet just some – we admit that – of the new demands. This centre is a physical entity, as is the Library, but it has been established with the purpose of being able to make **electronic** information resources available via an

appropriate and professional targeted user interface accessible 24 hours a day! Besides, the centre gives access to IT-educational facilities used frequently by the Library as well as the Faculty.

The resources of the centre is a lot of hardware, however, the most important thing is of course all the software and the information resources that are accessible here. All the electronic information resources of the Library are accessible via a user interface we have developed in co-operation with the Faculty of Modern Languages and Mjølner Informatics, an Aarhus IT-enterprise domiciled in Forskerparken (Science Park). Mjølner has developed a tool that in a simple way can generate a navigation map – for our user interface we have chosen the Metro metaphor. The product named Web Wise is here used as a graphic design tool which automatically generates a route network (Map of the Metro) according to the designer's instructions. The designer can thus concentrate on structuring the contents and giving the interface a well-arranged appearance. The graphics are generated automatically!

The IT-development behind the concept is owing to Mjølner Informatics to a high degree. The Library and professionals within business language have provided the input from the users' side, something that has given Mjølner knowledge of how the users think and behave. The cross-disciplinary co-operation between language people, the Library and Mjølner Informatics has been extremely exciting. This way of working gives inspiration and nourishment to good solutions as regards presentation of electronic information. The whole idea of our Learning Resource Centre is precisely KNOWLEDGE SHARING crosswise of professional knowledge.

The centre is not only a tangible result of the co-operation to establish the Danish Gateway to Business Language. It is also a result of the co-operation to create a series of technology-supported educational courses within the projects supported by CTU (Denmark's National Information Centre for Technology Supported Learning) named "Knowledge and Education Forum" and "Diploma in Accounting as a Technology-Supported Education", and finally the project supported by DEF (Denmark's Electronic research Library) called "The Electronic Research Library in the Virtual Learning Environment". They are all projects that have been carried through in continuation of one another at the Aarhus School of Business in the years 1998 to 2000.

The Electronic Research Library in the Virtuel Learning Environment

In these projects the work was development-orientated with the aim of creating a linkage between the electronic research library and technology-based educational environments.

The purpose of the CTU-supported KEF-project called "Knowledge and Education Forum" was to create a model for a virtual education and knowledge forum where the student has access to the electronic research library. The project was carried through in close co-operation with the Faculty of Modern Languages. The project included a pilot project, the distance-based course named "Medical Text Production". An IT-solution was established to handle the documents upon which the course was based. This solution was also used as a framework of the course package which – besides access to electronic documents – also included factual information about the course. An electronic conference system was linked to it all.

This model was used again in the following project – financed by DEF, Denmark's Electronic Research Library. The model proved to be sustainable having been implemented in connection with fourteen technology-supported courses held especially at the Faculty of Modern Languages, but also at the Faculty of Business Administration. The focus of the DEF project was to develop the experiences gained from KEF within the following three areas:

- User interface
- Access and management systems for electronic information
- The copyright issue

The role of the Library was to create the technological framework for the course and to give access to documents. Besides, the Library acted as a clearing house in relation to literature protected by copyright. The co-operation between the professional community at the Faculty of Modern Languages and the Library has been an indispensable condition of the results achieved.

At LASB we have thus been lucky to be able to work project-orientated as regards these issues. It has given us the chance to start developing our service to make it geared to tackle the changed patterns of study. To an equal extent it has been important to rouse the teachers' awareness and to draw their attention to the fact that the Library is an important player in relation to the planning of educational courses: An active player in the team of facilitators who support an educational course.

We have been working with technology-supported education and access to library resources in different ways, since the educational courses have been different, and so have the demands we were confronted with.

Management of Documents and Management of access and user control

A crucial role of the Library has been the management of documents and the clearing of literature protected by copyright. We have set up the teachers' own documents on our server, and in some cases we have implemented access control to these documents according to the teachers' wishes. Access control was always required when we had to deal with literature where the editors or the authors had allowed it to be available to a certain number of students for a limited period of time. The demand for a secure access and user control gets more and more urgent concurrently with larger and larger amounts of information being made available electronically. To the publishers it is of vital importance that the distributors of information have tools that can manage a differentiated use of the information resources. We have to be able to substantiate the use of the documents to the publishers, and consequently the system must also be able to handle statistics. By now we have got a capacity in relation to the e-learning courses the Library is involved in. It requires a professional document management system designed to solve some of the issues that we have struggled with in our project:

1. Access control to secure that the copyright is protected
2. Drawing up of licence contracts
3. Handling of payment
4. Full free text search and metadata search
5. Easy way to set up documents in the system

The copyright issue is closely related to the access and user control. The very strict copyright legislation is exactly bound up with the fear of the unverifiable spreading of information. In both CTU-projects and in the DEF-project we have exposed a series of problems in connection with clearing of supplementary literature. We have gained some experiences in this field that by now comprises a range of Danish and foreign editors. Our conclusion on the copyright issue seems to indicate that it is not a valid solution to handle the copyright act in this way. It will be a transitional phenomenon that can solve some problems, while we wait for new forms of publishing like e-books, access to e.g. Netlibrary, and on the whole a fully developed access to electronic information resources. Here it must be a natural part of the electronic research library to accept students who are not present physically on campus. It is of the utmost importance that contracts on all national licences also include access for this group of students. Not all courses are supported by electronic course packages. The Open University Library in UK has started a five year Learner Support Strategy that focuses on three areas:

1. Access to information resources
2. Development of information competence
3. Support to students

Overall, experience shows that distance learners have a comprehensive need for access to information resources and for development of their information competence, since they do not necessarily have a background where these qualifications have been developed.

In the CTU-supported project "Diploma in Accounting as technology-supported education" we have likewise worked hard on those three areas. As part of the user interface on the Internet upon which the course is based, the students get access to our own database and to selected and relevant information resources. The optimum would be to be able to offer these students access to precisely the same resources as have our daytime students as regular visitors to campus. But here we have encountered technical

barriers and problems with the access control. It has been useful for us – together with the teachers – to select exactly the information resources that this group of students were expected to need in connection with the writing of their seminars. Then we have negotiated with suppliers, and by now we have obtained the permission to offer the students direct access to the comprehensive database for business economics ABI/Inform. We are also negotiating with a Danish publishing firm about getting access to Revisorhåndbogen (Accountant's Manual).

A user guide for the Library is included in the user interface for the course, and we have made a point of offering introduction and lessons on relevant information resources to the students.

Summary

In all the projects we have had good experiences with giving information and communicating in virtual environments – both as regards the distance learners and the part time students, and in the long view as regards the virtual university students of the future. It is our firm belief that to a still higher degree these two target groups will make up our future group of users - and that the libraries are to be geared to offer services that satisfy their needs. With the DEF-project and its prolific undergrowth of partial projects we are already well on the way to work in electronic dimensions. The electronic research library is certainly ready for being integrated in the future offers of virtual education and courses. But **our** offer for this integration suggests a close co-operation with the teachers about the creation of the electronic course packages.

As was the case with creating the best possible physical framework for study and learning, it is important that the cross-disciplinary qualifications come into play to achieve the best results. In order to prepare the best electronic educational programme where parts of the electronic information resources of the Library are integrated, these have to be included at an early stage, and the dialogue between teacher and library has to start already here. We have experienced that the parties can inspire one another in this process and thus enrich the completed educational offer.

Such a cross-disciplinary co-operation between the Library and the professional environment is of the utmost importance if the future study and learning environments have to be serviced in the best possible way. The Aarhus School of Business has just set up a task group under the IT-Committee in the field of e-learning with representatives from the Faculties and under the chairmanship of the Library, realizing the importance of having all parties included when an educational establishment is to offer virtual education programmes.

At the LASB we would very much like the Library to be included in the educational and research profile of the Aarhus School of Business – also when applying for external project funds. And the Library was in fact included in the shares given to the Aarhus School of Business in some of the large consortia established in connection with the application round for Denmark's Virtual University.

The DEF-project has made the research libraries a strong partner in the co-operation to establish the Virtual University. Let us strike while **the iron is hot**, seize the opportunity and thus take part in influencing this fantastically exciting, provocative, and at present hot field of development.

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DISTANCE METHODOLOGY OF TELEMEDICINE IN MID-SWEDEN

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Introduction

In 1998 the Swedish National Institute for Distance Education, SSVH, and the County Council of Västernorrland began a project of telemedicine, "Distance Methodology of Telemedicine". The project lasted three years and was finished in the spring 2001.

Background

In 1996 the County Council of Västernorrland started to invest in videoconferencing devices at several health care centers and hospitals in the region of Västernorrland in the Mid-Sweden area. The idea was to introduce visual communication between the health care centers and the special clinics at the hospitals in the County of Västernorrland. In the beginning the videoconferencing equipment was to be found only in the health care centers in remote areas, far away from the hospitals.

In order to facilitate for the patients and avoid unnecessary travelling, the physician of the health care center would have the possibility to consult the specialist by video conference, together with the patient and the benefits would be time, money and environmental benefits. This would implicate a completely new way of working and would also change the patients role to be part of the process in quite a different way than before, when doctors only talked to doctors and most of the time in written in patient records.

But only video conferencing equipment was not enough to make the doctors use the technology. Most doctors did not know how to use the equipment, nor did the nurses or the secretaries and things went on as before. The County Council made a pre-study in order to find out the needs for training and instruction. The pre-study made it clear that the users needed technical hands-on training, patient consultant training and how to act before the camera.

Objectives

In order to increase the interest for video conferencing among the health care personnel, a course "Distance Methodology of Telemedicine" was offered to all categories of personnel in four health care centers well as in the the hospitals of Sundsvall and Örnsköldsvik. The course was a given as a distance course, with one personalmeeting of two days in the beginning of the course and one more day at the end. In the meantime the participants would interact with each other and the tutors by a computer conference on the internet. The total length of the course were 15-18 weeks and as a total study time was calculated 60-80 hours, depending on the access to internet and spare time during the working hours.

The objectives for the course were to implement a new way of working and to get acceptance among the staff, as follows :

- To increase the awariness of telemedicine and its impact in the future health care systems
- Technical hands-on training on video conferencing
- Computer training and knowledges of the use of internet, to be able to communicate with other participants and the tutors
- The taking of images, storing and sending the same over the ISDN
- Patient consultant training, in order to make the patient feel at ease in contact with the specialist
- Patient empowerment, i e the patient would be a part of the process and feel responsible for his/her own treatment

Technology of the project

When this project started, broad band network were not common, so the technology which was used was video conferencing by ISDN, a solid technology that guarantees quality and reliability for the user. Video conferencing equipment Sony 50 100 P were installed in the health care centers of Bredbyn, Kramfors, Fränsta and Ånge as well as in the Departments of Dermatology and Otorhinolaryngology of the hospitals of Sundsvall and Örnsköldsvik. Later more equipments were installed and to-day the County Council of Västernorrland has some 20 equipment at their disposal, squattered all over the County.

At the health care centers, there also were equipment for image handling and storing of the same, as well as fiber optic endoscopes, VHS video record player and OH-device for video conferencing use. The images were sent over the ISDN to the departments in the two hospitals and the specialist could look at the images and then have the video conferencing meeting with the general practioner and the patient at the health care center.

The SSVH has been working with video conferencing for 10 years, and during this period the staff has acquired high skills and competence. The personal meetings with the group took place at the premises of SSVH and the introduction and hands-on training was given here.

For the contacts with the tutors and the participants of the group, internet was used and a special home page was set up for each course, where the participants could have all information and contact which was required. In the beginning of the project, the activity on the internet was very low, due to the fact that the participants did not have access to the internet, but this changed over the years that the project lasted.

Project staff

From the Swedish National Institute of Distance Education, three persons were part of the project : Mr Inge Bergqvist Technician, Mr Ulf Sandström IT-pedagogue and the author of this paper, Mrs AnneLi Avenas, Language Educational Manager. From the County Council of Västernorrland participated Mr Åke Qvarnström, General Practitioner of the health care center of Kramfors.

During this period, the SSVH started a new line of courses, namely health care courses for adults on secondary level. The project leader, Ms Christina Lindberg, also took part in Telemedicin during the spring of 2001.

Results for the project

Five courses were given between 1998 and 2001. Each course had 12-15 participants, mixed groups of personnel, doctors, nurses and secretaries. We soon realized that the different categories had different needs and expectations. The doctors were interested in telemedicine R&D worldwide but the nurses and secretaries wanted technical hands-on training. It was difficult to satisfy both groups in the same course. In the beginning, the use of internet was difficult, as the nurses and secretaries had little or none access to the internet during their working hours. However, during the period of the project the use of internet increased among the participants. The latter category learned thoroughly the technical use the equipment which has increased the use of the same. This is a very important result of the project, as there is a lack of doctors in Sweden and one health care center might have several different doctors during the year, while the nurses and secretaries normally live in the aera and work in the center all year round.

The category of nurses and secretaries normally are not offered as much training and courses as doctors are, in order to raise their professional skills and competence. Thus, they were almost reluctant to participate and in some cases even hostile in the beginning, as they were convinced that this task would be too difficult for them and they did not see the meaning of the course. However, once the first personal meeting was over, they were very enthusiastic for the task and worked hard with their assignments and mutual projects. At the end of each course, the participants felt that besides the technical and hands-on knowledge of the equipment, they also had gained a personal strength and confidence in themselves by participating in the course.

Results for the National Institute of Distance Education

The course was given as a distance course, which was the main reason for the Swedish National Institute of Distance Education, SSVH, to join the project. The SSVH was founded in 1962 and is well established as a distance educational organisation in Sweden and has a fundamental knowledge of methods and pedagogy as far as distance education for adults is concerned. As mentioned above, SSVH staff also has high skills of the use of video conferencing as a mean of transmitting education. During the years of the project, the participating staff from the SSVH has gained higher professional skills in the field of Telemedicine and also have built up a network with the participants of the course, as well as with other organisations and persons, both nationally and internationally.

The SSVH used their pedagogical skills to train the groups and as one of the basic ideas of adult pedagogy is to use the participant's own knowledge and skill, we used the participants from previous courses as tutors and specialists. One example is Mr Jan-Erik Rehn, General Practitioner from the health care center of Bredbyn, who developed high skills of image handling and storing.

The future

This very successful project, between two organisations which have an essential difference in their commissions, shows clearly that networking and collaboration is the way of finding new concepts and developing a new range of courses and educational concepts. Both parties added their special knowledge and competence and by using the technology to transmit the message, the mix gave us a completely new and successful concept.

For the future SSVH will continue to develop the gained knowledge and expand the network we've built, together with the County Council of Västernorrland and other actors in the field of Telemedicine.

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THE "NETWORKED SOCIETY" HOSPITAL AS AN IMPORTANT INTERDISCIPLINARY DISTANCE LEARNING FACILITY

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1. Introduction

The modern Hospital emerged gradually and successively, during a very long historical development, from a religious philanthropy Institution to the contemporary managed care Establishment. The civil structure, the social demands, and the individual performance were always and are still reflected, on the Hospital, throughout the centuries. An attempt follows, to deal with a specific process in the professional and scientific context of the contemporary Hospital, that of its transformation into an important interdisciplinary Open and Distance Learning Facility, within the framework of the emerging "networked Society".

This long scale educational procedure, beyond the employment of on-line training means, completing the traditional student and professional continuous education, is gradually including a large patient audience. Further, it is also informally addressed to the general public, in an effort to "keep them healthy" and consequently out of the Hospital. This transformation creates a new patient-hospital relation and raises some important ethical and social issues, related to a different aspect of the mission and of the social role of the 21st Century Hospital.

2. On-line training means and traditional student education

The emerging society is characterized by the availability of information beyond traditional means. A cardinal feature of our era, is the translocation of precious information from the books to the Internet, and this fact result in that knowledge and professional skills are not based on memory anymore, but rather on the ability of effective and efficient navigation through the available Information Ocean. Hypertext and multimedia courseware is gaining importance in University education. Transforming conventional lectures or textbook material into an electronic format, offers limited benefits thus, the structure and the content of a course should be changed in order to take advantage of the technology. HTML or XML etc. based teaching tools interact both with teachers and students and they may influence our understanding of the scientific subject matter under consideration.

Distance education using Web-based and other emerging technological alternatives promise to reach various groups, offering them post-graduate and continuous education services. These groups may comprise of those who are already engaged in professional work, such as physicians, nurses, engineers, physicists etc. and of those isolated from such opportunities, due to other social conditions. These groups are not likely to receive the same educational experience as traditional, on-campus students. The concern that technology-based distance education is inferior is probably not unwarranted. However, the new electronic media may offer a cost-effective way, to enhance post-graduate education alternatives.

The experience accumulated during elongated traditional and on-line educational activities has led to the creation and application of an extended series of on-line training means, focussed mainly to the field of the employment and the management of contemporary Biomedical Technology by health-care students and professionals, in the modern Hospital. The most important issues addressed, have already been reported elsewhere [1], [2], [3] and include, first the structure and the function of equipment and methods, according to the hospital departments, such as the Outpatient and the Accident-Emergency Departments, the in vitro Diagnostic Laboratories, Medical imaging, the Operating Room, the Intensive Care Units and the Wards and some other Therapeutic and Supporting Facilities. HTML was mainly used to develop the various educational means, to enable use on any platform, and numerous objects in commercially available digital document, audio and video formats, have been also included, resulting in on-line lessons, lecture-slides, lecture notes, digital video material, self-evaluation quizzes etc. The content of the presentation is a combination of theoretical knowledge and practice oriented information and the languages used are Greek and English.

An academic course primarily consists of a mutually interacting group. "Digital alternatives", such as email, electronic discussion groups, virtual classrooms etc., are very useful, not only for individuals, but even for Institutions, which are not able, nor willing to create an adequately high academic environment. Presently, it seems likely, that distant post-graduate courses, will not develop into a total substitute for in-person education, but rather an appropriate combination of traditional and on-line educational activities will follow. On-line instructional material accessed by the students, may also partially release the teaching staff, and offer them more time to concentrate on more substantive tasks improving their interaction with the individual student. The new educational technologies are likely to force us, to reexamine our educational policies. University education is not just about mastering knowledge, but rather developing the students' personality and their special abilities, in a given social context. The cautious application of the emerging information technologies in Education may contribute towards this goal.

3. Interdisciplinary Continuous Education and Guideline-based Medical Decision-Making

Continuing Medical Education (CME) constitutes a specific kind of education, and nowadays it is a requirement among practicing physicians to promote continuous enhancement of clinical knowledge to reflect new developments in medical care. Lifelong learning is critical to current physicians who are being held to high levels of accountability to patients, health-care payers, and society at large. Continuing medical education (CME) attempts to address these needs of practicing physicians by reinforcing clinical knowledge and presenting new developments in medical care. Traditional CME activities have included self-study by employing journals and textbooks, participation in medical groups, and attendance at lectures and conferences.

In general, these types of formal learning, have limited impact on clinical practice, since activities that target a specific need of the participants and actively engage the target group in the training process, seems to result in better outcomes. Programs that simulate physician work conditions, such as diagnostic role-playing, with data drawn from actual patient cases and feedback from medical experts, have been shown to have the best results. The employment of information technology constitutes appropriate means of providing active learning, and practice oriented CME content. The effort of the last years, to adapt computer software and patient information systems to continuing medical education, has resulted in, the creation and the development of numerous on-line CME sites, covering a wide range of medical specialties.

A major problem in CME is that research is producing increasing amounts of important new evidence for health care, but there is a large gap between what this evidence shows can be done and the care that most patients actually receive [4]. An important reason for this gap is the extensive processing that evidence requires before application. A method for bridging research evidence to management of clinical problems is first, getting the evidence straight, second, formulating evidence-based clinical policies, and third, applying evidence-based clinical policies at the right place and time. This model provides a framework for coordinating efforts to support evidence-based medical care, and contemporary information technology allows for the coordination of the roles of all the key players, including health care researchers and practitioners, health care organizations, and the public.

Health informatics has already made important contributions to bridging research to practice, by first, improving evidence retrieval, evaluation, and synthesis; second, by developing new evidence-based information products, and third, by offering computerized aids that facilitate the use of these products, during clinical decision making. However, much more innovation and coordination are needed concerning first, the quality of evidence embodied in information innovations, second, the performance of technologies and systems that retrieve, prepare, disseminate, and apply evidence, and finally, the fit of information tools to the specific clinical circumstances, in which evidence is to be applied. Therefore, effective interdisciplinary teams are needed to achieve the optimization needed.

An important role is assigned to the employment of Medical Records for the CME procedures. Medical records are used in a variety of ways and they serve a multiplicity of purposes. Beyond the explicit involvement of records in the therapeutic process, there are several other discernible uses, such as in research, in teaching, in the allocation of resources, and in the construction of the patient's personal history. The technological substratum of records, on the one hand, constitutes itself knowledge and, on the other, it plays a decisive role in forming the character and the extent of the knowledge, which the records themselves represent at each particular stage of their mutual interaction [5].

Most clinicians in the U.S.A. [6], [7] feel that the Electronic Medical Record has improved the overall quality of patient care. They feel that the Electronic Medical Record has also improved the quality of the patient-clinician interaction, the ability to coordinate the care of patients with other departments, the ability to detect medication errors, the timeliness of referrals, and the ability to act on test results in a timely fashion, i.e. clinicians perceive an overall improvement in patient care as a result of using an outpatient Electronic Medical Record system. However, less than 15% of respondents used computers for continuing medical education (CME). Respondents reported they wanted to increase their general computer skills and enhance their knowledge of computer-based information sources for patient care, electronic medical record systems, computer-based CME, and Tele-medicine. While most respondents used computers and connected to the Internet, few physicians utilized computers for clinical management. Medical organizations face the challenge of increasing physician use of clinical systems and electronic CME.

A further important issue related to CME is the elaboration, adoption and dissemination of appropriate Medical Guidelines, as well as, the development of computerized procedures, associated to their employment. The development and implementation of enabling tools and methods that provide ready access to knowledge and information are among the central goals of medical informatics. Given the immensity of the challenge, the need for multi-institutional and multi-national collaboration in the development of such tools and methods is increasingly being recognized. The electronic modalities for communication, and other related technologies can play an important role, in supporting collaboration, especially when the participants are geographically separated. However, it is still important to match carefully the content with the mode of communication, identifying for example, suitable uses of email, conference calls, and face to face meetings. The role of leaders in guiding and facilitating the group activities can also be seen, regardless of the communication setting in which the interactions occur. Most important is the proper use of technology to support the evolution of a shared vision of group goals and methods, an element that is necessary before successful collaborative designs can proceed [8], [9], [10].

Another important aspect, related to CME and the day to day clinical education of trainees, is the creation and employment of various types of Guideline-Based Decision-Support Services. Interesting classification schemata and Task-based approaches to define guideline-based decision-support services have already been reported [11]. On the one hand, they can categorize uses of guidelines in patient-specific decision support into a set of generic tasks, such as decision-making, specification of work to be performed, interpretation of data, setting goal, and issuance of alert and reminders that can be solved using various techniques. Based on the tasks and the guideline model, a guideline-execution architecture is defined, as well as, a model of interaction between a decision-support server and clients that invoke services provided by the server. These services use generic interfaces derived from guideline tasks and their associated modeling constructs. Thus, a well-defined specification of guideline-based decision-support services facilitates sharing of tools that implement computable clinical guidelines [12], [13].

On the other hand, developing guidelines that are specific to an organization is expensive, and limits the ability to share guidelines among different institutions. Methods have been employed [14], [15] that separate the site-independent information of guidelines from site-specific information, and that facilitate the development of site-specific guidelines from generic guidelines. These methods allow for developers to create generic guidelines that are sharable across different sites. When combined to site information, generic guidelines can be used to generate site-specific guidelines that are responsive to organizational change and that can be implemented at a level of detail that makes site-specific computer-based workflow management and simulation possible. What features will be important to encode in the site model will, in part, depend on the application for which the guideline will be used. For example, if the generic guideline is to be specialized for use in a clinical information system or workflow environment, the site model would need a detailed description of resources and resource constraints, which this particular site and application requires. A different institution might use the same guideline for education and training, but their site model then should contain information about supporting reference material.

In recent years, guidelines and protocols [16], [17], [18], have gained support as the vehicles for promulgating best practices in clinical medicine, and many researchers have proposed frameworks for modeling them in a computer-interpretable format. Some projects use computer-interpretable guidelines to provide patient-specific decision support for chronic-disease and clinical-trial therapy planning. In these uses, criteria that test for specific patient situations are paramount. Other projects, however, study communication and coordination problems involved in implementing clinical protocols in an

organization, using information-processing approach that abstracted away specifics of individual patients that are important for patient-specific decision support. A third way is modeling reporting and meta-analysis requirements of clinical-trial results. However, how computer systems use computer-interpretable guidelines has not been fully studied. Health care providers are more likely to follow a clinical guideline if the guideline's recommendations are consistent with the way in which their organization does its work and it is still an active research issue to define the features of a site model that would facilitate these customizations.

Finally, it seems that the best opportunity to improve the efficiency, the cost and the quality of patient care is by including organizational factors in guideline development. If the site-specific guidelines are valid and consistent with respect to the intentions and goals of the guideline authors, attention should be focussed on the process of care and ways in which it might be changed to improve patient care quality. Thus, the adoption of an appropriate procedure contributes also to CME improvement and to the achievement of an overall best practice.

4. Informal Patient on-line Health Education

The use of computer-based education had a positive impact on clinical outcomes, knowledge acquisition, self-care management, and skill development. As the focus of health care delivery environments moves toward health promotion and the management of chronic disease, it appears that computer-based patient education will have a greater role in supporting patients' understanding of their personal disease management plan.

Technology is providing innovative ways for patients to extend their world. Online communication offers connection between patients and health care providers, and online support groups expand the team approach to include other patients facing similar health challenges. Patients who are dealing with disabling conditions are able to use technology to "virtually" participate in activities that would otherwise not be possible. The social integration and sharing of knowledge that occurs through these new connections may increase involvement in learning and expand patients' understanding of their medical conditions.

It is important to understand how the patient is processing the information and translating this understanding into action. To individualize patient education materials, developers must consider the unique needs of the target audience to include culture, age, race, gender, and social issues and physical and psychological or cognitive disabilities. Internet-mediated triage systems can facilitate access to electronic and human information resources [19], [20].

Concerning the validity of this information, it is profound that the Internet has fundamentally changed the dynamics of publication, and in particular, it is clear that there is no effective way to control the release of any web-based publication [21]. The scientific and lay literature is now accessible to the public with unprecedented ease. This certainly suggests that there is a need for a change in how the process works.

This is already occurring, in newsgroups, on mailing lists, and among communities of information consumers and information providers. Patients, care providers, and other participants are describing, summarizing, rating, applauding, recommending and condemning websites, newsgroup threads and printed paper articles. At this time, the process is ad hoc and the efforts of one community are not easily communicated succinctly and reliably. However, this process is happening, and the scientific community needs only to decide whether to participate in or ignore it.

5. Concluding remarks

Medical data, disseminated in the Web or available in other digital forms, on the one hand, constitute cost-effective and practical means, augmenting equality in medical training, on the other, they result in a new type of fragmentation and compartmentalization of the patient's body and personality, thus endangering the interpersonal relation between him and the physician.

Obviously, this new "networked" environment has an influence on the health-care professional codes of conduct [22]. These codes appeared together with the emergence of socially recognized groups of specialists in various fields of practice, and they set the framework, within which the professional-client

interaction is carried out. The 21st Century Hospital will provide a radically different professional and educational activity environment and a quite different professional-client interaction modus. Although modern medicine is still based on people memorizing scientific knowledge, the elimination of limitations to access medical knowledge is already an irreversible procedure.

Virtually, everyone has access to medical information, independent of the validity and the value of such information. This fact creates a new type of a self-confident "over-informed" patient and, on the other hand, a critically judged physician. What remains to be seen, is whether this arising "medical landscape" of tomorrow, will help the Physician to reinstate the holistic approached, individual patient in the compartmentalized Medicine of today.

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WORKPLACE LEARNING IN SMALLER FIRMS - A PROPOSAL TO MAKE IT HAPPEN!

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Abstract

The need to use workplace learning as a means of addressing the issue of skills shortages in the UK has been highlighted by professional organisations (Chartered Institute of Personnel and Development, IPD 2000) employers' organisations (Confederation of British Industry and trades unions (Trades Union Congress)). Skills shortages are particularly a problem for smaller firms in that they can hold back company growth. The UK government has also recognised the need for learning to take place by workers, using its lifelong learning policies to address the issues. This paper explores the relevant literature on workplace learning, as it relates to lifelong learning, and considers the regional context (that of the county of Dorset in Southern England). The paper also considers how the concepts relate to small businesses in the area and sets out how Bournemouth University is attempting to address the issue of making workplace learning (known more commonly as work based learning (WBL)) in smaller firms happen.

Lifelong Learning in the UK

Lifelong Learning – is a term that has been used and abused in much recent literature. The exact definition depends upon the perspective from which the concept is approached. What can be claimed as a common feature of any definition is the idea that the human being continues to learn new things throughout their life span. The learning that takes place is not necessarily the product of formal education, nor is it necessarily vocational. It is at this point that common ground begins to disintegrate. Clearly the recent UK government policies which have seen the establishment of the Learning and Skills Councils and education targets for different age groups within society, sees lifelong learning as being formal education, having a vocational focus to improve the economic productivity of the UK. Other groups, including many Higher Education Institutions (HEI's), see lifelong learning as encompassing formal education but not necessarily with a vocational focus. Yet further groups see lifelong learning as not requiring formal education but is the sum total of life experience. The definition that will be assumed in this study is that taken by many HEIs, namely, formal education that may, but not exclusively, have a vocational focus. However, the definition of formal education has been stretched in recent years (see literature review).

Literature Review

Lifelong learning and WBL are relatively new ideas to higher education (HE) in the UK, however, since the early 1990s there has been a lot of interest in the area. The 1990s saw a plethora of literature discussing the various implications of Lifelong Learning for HE as well as trying to define what was meant by Lifelong Learning. The UK government began to articulate their current view in 1996 and 1997 (DfEE, 1996, 1997) and broadened the view in 1998 (DfEE, 1998). The view articulated is one that learning or education is good for you and that lifelong learning should be vocational to improve the economic performance of the UK.

The term lifelong learning has been defined above. However, the term WBL also needs to be defined in the context of this paper as it is a broad term and encompasses many concepts of learning. The definition used in this paper is "learning for work, at work and through work" (Raelin, 1999). So how does this differ from the more conventional 'on-the-job' training which is prevalent in small businesses? Curran, Blackburn, Kitching and North (1996) see 'on-the-job' training in small businesses as being 'in-house', self-directed, short duration and informal, possibly ad-hoc in nature. This type of learning is likely to be unconscious and there is unlikely to be explicit knowledge about what has been learned. WBL aims to make the learning conscious and the knowledge explicit while retaining the opportunity to link theory and practice in real-time.

Theories of WBL have been developed by a number of authors: Marsick et al (1990) for example developed a model of informal learning. Marsick et al(1999, p94) revisited their 1990 model and concluded that: "Informal learning is playing an increasingly central role in the lives of individuals and the agendas of organizations. Informal learning is not a substitute for structured training or education." Further, while informal learning allows closer working with co-workers and customers and may be subject to fewer difficulties with transferring learning to the work, it has the potential for lack of critical reflection on work place policies and practices. Raelin (1999) and Eraut (2000) both argue that new, or different, locations encourage new approaches to problem solving whereas familiar surroundings encourage known solutions. Keeling et al (1998) also note that some professions demand a theoretical foundation that can only be gained through formal study.

Some HEI's in the UK are far more advanced than others in provision of WBL opportunities, for example, the University's of Lincolnshire, Middlesex and Anglia Polytechnic University all operate post and under graduate programmes with WBL elements. In the case of Middlesex total programmes are comprised of WBL. Most of these operate WBL using a system of negotiated learning contracts, with specified learning outcomes, with student support being provided by an academic tutor and a work based mentor.

A recent conference "Work Based Learning : Making it Happen Conference" (Cambridge UK) discussed the following questions in one workshop:

1. What does workbased learning look like in the smaller firm?
2. What are the barriers to learning in smaller firms?
3. How can the barriers to learning be overcome?

The answers that were suggested to question 1. are particularly pertinent for the development of a learning opportunity for small firms, they included:

- Learning needs to present an instant solution to a pressing problem -need driven
- Learning may be unrecognised
- Reactive, sporadic, problem-solving, short-term, opportunistic, practical
- Little time for reflection
- Management skills needed to develop people as well as processes
- Aimed at essential concerns of the business
- Highly diverse reflecting the diverse nature of smaller firms

The Dorset Regional Context

The sub-region is essentially a 'small firms' economy with 92% of companies employing less than 25 people. 1% of companies do, however, employ over 100 workers and account for approximately half the workforce. More than half of these companies are within the South East conurbation, which also has a high share (66%) of value-added industries while the rest of Dorset is characterised by declining agriculture, forestry, fishing and defence industries. Currently 58% of all employers provide, or support, training in any 12 month period. Half of this is 'on the job' training (BDPEP 1998). The most common forms of training are: short courses (56%); written or computer based materials on site (39%) and day release courses (24%) (BDPEP 1999). 20% of companies have a skills gap, this is most frequently identified as IT but also technical and specialist skills (banking, finance, engineering, construction, communications) and management skills (Leeds Met Uni (2000), BDPEP(1998), KPMG(2000)). 30% of companies have experience recruitment difficulties, particularly in manufacturing, construction, distribution, hotels, restaurants and financial services (these vary from unskilled to professional). Half of the businesses surveyed intend to increase their training programme to counteract recruitment difficulties (BDPEP, 1998 & 1999). Significant demand for professional development courses is evidenced by Integrated Workforce Development Strategy (Dorset TEC 2000) (3,600 adults per annum required with qualifications at level 4) and the KPMG HE Demand Study (between 47% and 52% growth in HE participation by 2010).

A recent survey (Leeds Met Uni 2000), demonstrated that there was satisfaction with the general level and quality of education and training provision in the region (Dorset, Bournemouth & Poole), employers observed that the providers themselves need to become more aware of, and responsive to, business needs. Greater flexibility and adaptability in the delivery of courses and programmes was also recommended.

The Integrated Workforce Strategy also suggests that a significant proportion of people do not hold formal qualifications and also need mechanisms for accrediting workforce learning to encourage career development through credit accumulation. Thus there is clearly a need to provide WBL within an overall structure of learning that incorporates elements of formal study and that can be recorded, accredited and recognized as part of continuing professional development.

The Bournemouth University Continuing Professional Development framework:

Thus, Bournemouth University has developed a Continuing Professional Development (CPD) Framework aimed at individuals working in small businesses.

Philosophy:

The CPD Framework is designed to provide a flexible framework to support the development of a broad, vocational, academically challenging provision tailored to suit the individual needs of professionals in the local region. It is intended to promote the further development of higher education provision at Bournemouth University in an efficient and accessible manner, allowing the maximum use of resources and developing relationships across the Academic Schools. The highly flexible, modular and credit accumulation nature of the framework is something of a departure for the University but is vital if participation from a wider and, as yet, not engaged audience is required.

The framework aims to enable participants to:

- access and participate in CPD opportunities;
- develop substantial transferable skills and attributes;
- integrate theory and practice through work-related projects;
- manage their own personal development and career progression;
- create responses to problems that expand or redefine existing knowledge and/or develop new approaches in new situations;
- develop themselves as advanced professionals through reflection; conceptual development and independent research/project based work.

The following awards are available:

- Postgraduate Certificate in Professional Vocational Development – 60 credits level M of which 15 credits must be a WBL unit
- Postgraduate Diploma in Professional Vocational Development – 120 credits level M of which 30 credits must be a WBL unit
- Masters degree – MA in Professional Vocational Development – 180 credits level M of which 60 credits must be a dissertation/project and the Forms of Enquiry/Research Methods unit from a variety offered in the University must be successfully completed.
- A certificate of credit will be awarded for each unit successfully completed.

The framework consists of a combination of taught units, from a portfolio of existing post-graduate units from across all Schools of the University, WBL units and a Study Skills/CPD Skills unit and Dissertation for Masters. There is also the opportunity to apply for APL and an APEL unit worth 15 credits. These units can be combined in any order and over a maximum registration period of 10 years. Framework diagram is at Annex A. It should be noted, however, that success is considered to be attained through the

successful completion of units but not necessarily the completion of an award. Thus allowing companies to gain access to new skills for their staff in a timely manner.

The WBL units offer the opportunity to learn at work. Most places of work provide excellent opportunities for learning at all levels. Frequently, this learning takes place automatically in the course of other activities, but this unit aims to provide the learner with the opportunity to demonstrate their learning by undertaking an in-depth investigation of an issue arising from their occupational or professional activity. In WBL 1 the learner is expected to demonstrate achievement of the learning outcomes with reference to their personal professional development, in WBL 2 the learner, in addition to this, is expected to demonstrate achievement of the learning outcomes with reference to their organisational or professional context.

As with any learning opportunity there are strengths and issues that will arouse debate surrounding the CPD framework which are summarised below:

Strengths	Issues for debate
Flexibility	Curriculum coherence
Vocational relevance	Student support
Can be diverse	Academic rigour
Can be short term	Assessment measures
Can provide an instant answer	
Can be part of work activities	

A wide range of stakeholders have been consulted in the development of this framework, including: businesses; professional institutions; business organisations; other education providers; prospective individual learners; and not-for-profit organisations.

Conclusions

It is clear that if lifelong learning is to be a success which it needs to be for the long term economic prosperity of the UK, and the region of Dorset, it must be embedded within the workplace. In the case of Dorset, this means, predominately within, small and micro (less than 5 people) businesses. What is equally clear is that the nature of lifelong learning in this context must adhere to a number of principles if it to be accepted:

- flexible
- economical with time and money
- vocationally relevant
- takes account of both informal and formal learning

The CPD framework outlined in this document attempts to provide an opportunity for learning incorporating these principles. Clearly there will always be tension between formal and informal learning usually related to the ability to assess the learning and thus, prove academic rigour has been maintained.

The next task is to extend this opportunity to undergraduate level to provide opportunities for vocational development at a lower level. A slightly greater set of challenges will need to be met particularly related to support for students who are unlikely to have studied at HE level previously.

ANNEX A

The Framework Diagram

Variant 1: MA Professional Vocational Development

Masters stage 60 M-level credits	Dissertation or Project 60 credits
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120 M-level credits	[unit title] 15 credits	[unit title might be WBL unit from PGDip] 30 credits	[unit title] 15 credits
	[unit title] 15 credits	Induction Programme CPD & Study Skills - 15 credits	[unit title] 7.5 credits [unit title] 7.5 credits [unit title] 15 credits

Other combinations of 'base 15' etc units could be put together as additional variants.

Variant 2: PG Dip: Professional Vocational Development

PGDip stage 60 M-level credits	[unit title] 15 credits	[unit title might be WBL unit from PGCert] 15 credits	WBL unit 30 credits
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60 M-level credits	[unit title] 15 credits	[unit title] 15 credits	Induction Programme CPD & Study Skills - 15 credits	[unit title] 7.5 credits	[unit title] 7.5 credits
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Other combinations of 'base 15' etc units could be put together as additional variants.

Variant 3: PG Cert Professional Vocational Development

PGCert stage 60 M-level credits	[unit title] 15 credits	[unit title] 15 credits	Induction Programme CPD & Study Skills - 15 credits	WBL unit 15 credits
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Other combinations of 'base 15' etc units could be put together as additional variants.

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OPEN DISTANCE LEARNING EDUCATION FOR TRAINING IN ENGINEERING INDUSTRIAL VIRTUAL ENTERPRISES

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Introduction

Technological Systems Engineering and Management Faculty has started open distance learning courses for engineering in several well equipped laboratories of which the primary functions are to support students and faculty for teaching and research and to involve in outreach programs. It has its own LAN system connecting offices and laboratories with the Internet access.

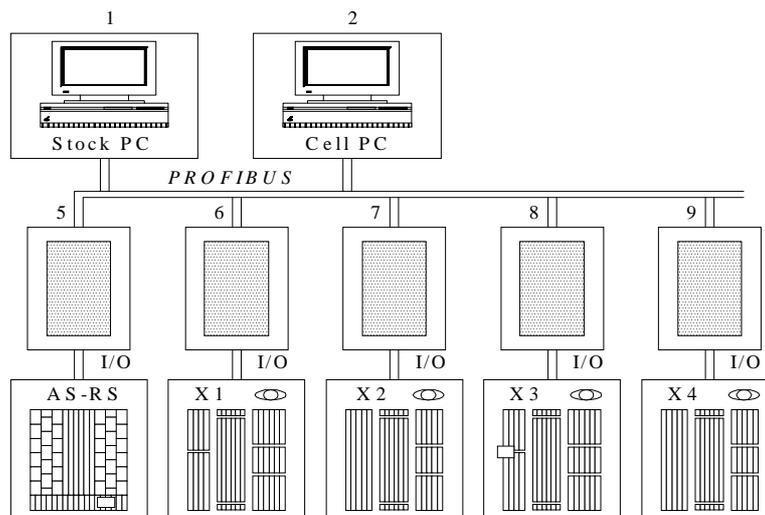


Fig. 1 System Topology

The Industrial Management and Marketing laboratory is equipped with computing facilities, a Window NT cluster running on Pentium PC networks for general applications and internet access, an HP UNIX cluster at the high end running powerful project planning, discrete material flows simulation software, and optimization packages.

The CIM laboratory is equipped with state-of-the-art process automation equipment employed in real high tech systems used in modern industries. The equipment consists of networked programmable controllers (PLCs) with demo process models, distributed process control system, graphical control panel, human-machine interface station with operator communication and visualization software.

Laboratory is also equipped with state of the art six-axis industrial robot from Mitsubishi. All the equipment in this laboratory is interconnected using Internet and Profi-bus (Fig. 1). The research activities are undertaken in close collaboration with industry in the area of automation, mobile robotics, system design and integration.

The concept of Virtual Enterprise (VE) is mostly associated with specific characteristics: a network of enterprises that constitute a temporary alliance in order to share their costs, skills and resources, in supporting the necessary activities towards the exploitations of fast-changing opportunities, for product or service requests and competitiveness in a global market. We define a structure, named *“Platform for Training in Management and Engineering for Industrial Virtual Enterprises*, needed to train the students, the future engineers, who must be able to work in the VE and in the context of globalization of the production and manufacturing, imposed by two most important changes of the last years, the changes in information and communication technologies (ICT). Because of that, we need to train our manufacturing and production engineers in the conventional / traditional aspects of the manufacturing engineers with additional emphasis on the special skills requirements relate to electrical and computer hardware, data

processing, knowledge processing, advanced computing techniques, human computer interface, environmental issues and management skills for global manufacturing. In this way we are equipping ourselves to create and use the digital libraries, interactive on/line virtual classrooms / laboratories, multimedia and other advanced computing tools, associated to adapted traditional laboratories for training of students of for research activities, under the supervision and with the contribution of professors and manufacturing / industrial consultants and professionals, in the distributed heterogeneous environment, based on information and communication technologies (WWW, portals, etc).

1. Open Distance Learning on Virtual Enterprise

The materialization of the paradigm of virtual enterprise (VE), enabled by recent developments in ICT, requires the definition of a reference architecture and design and development of a supporting platform (hardware and software). In this paper we describe an approach being developed by some projects like the CNFIS-WB Project (243/1999), 71206-CP-1-1999-1-SOCRATES-RO-ODL, 71206-CP-2-MINERVA-RO-ODL designed to create an open platform for training the students and engineers to work in the new environment imposed by globalization in competition and manufacturing. It is generally accepted that a VE is a temporary alliance of enterprises that come together to share skills and resources in order to attend a business opportunity and whose cooperation is supported by computer networks and adequate ICT tools and special application software. Enterprises operate as nodes in a network of suppliers, customers, engineers and other specialized service providers. VE materialize by selecting skills and assets from different firms and synthesizing them into an apparently single business entity. A classification according to a number of characteristics has been proposed in:

- **Duration.** There are alliances made for a single business opportunity and which are dissolved at the end of such process, and long-term alliances that last for an indefinite number of business processes or for a specified time span. Typical examples of single business alliances can be found in large-scale engineering systems, such as, for instance, building a bridge. In the case of food industry it is more typical to find long-term alliances.
- **Topology.** Another way of characterizing a VE, with major impact on requirements specification for a supporting infrastructure, is to look for the topology of the network. The most demanding case is the one that shows a variable / dynamic nature, in which enterprises (non strategic partners) can dynamically join or leave the alliance according to the phases of the business process or other market factors. But in many sectors there are supply chains with an almost fixed structure (little variation in terms of suppliers or clients). Another facet related to the 'geometry' is the possibility of an enterprise participating simultaneously in various networks or being committed to a single alliance (exclusivity). It is also important to analyze whether the VE operates in a situation of monopoly or under open market conditions.
- **Coordination.** In terms of network co-ordination various models can be found. In some sectors, as typified by the automobile industry, there is a dominant company "surrounded" by a relatively fixed network of suppliers (star-like structure). The dominant company defines "the rules of the game" and imposes its own standards, namely in terms of information exchange. Similar examples can be found in the agribusiness sector. A different organization could be found in some supply chains without a dominant company (democratic alliance) in which all nodes cooperate on an equal basis, keeping their autonomy, but joining their core competencies. Once a successful alliance is formed, companies may realize the mutual benefits of having some common management of resources and skills and they may tend to create a kind of common co-ordination structure (federation). There are less real life examples of federated structures, but it will not be surprising if the market dynamics forces SMEs to embark in such deeper co-ordination alliances. Both related to topology and coordination is the aspect of visibility scope, i.e., "how far", along the network, can one node "see". In many cases a node only sees its direct neighbors (suppliers, clients). That is the case of most supply chains. In more advanced coordination situations, a node might have some visibility over other (non-direct) level. Portals, etc.

2. General architecture and required functionalities

As a general requirement for an infrastructure to support VE, it can be underlined that the companies must be able to inter-operate and exchange information in real time so that they can work as a single integrated unit, although keeping their independence/autonomy. A complete redesign of an existing enterprise to VE

would represent a big effort, not justifiable in market terms as companies are not replacing easily their running systems. A better strategy is to try to separate the internal functionalities from the network-related ones and develop the necessary mappings to legacy systems, to correspond to the new aggregator model for modern electronic commerce (fig. 2).

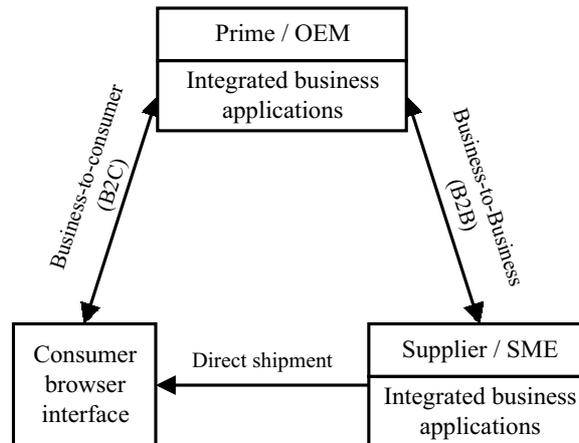


Fig. 2 The electronic commerce aggregator model

The model has three components:

- *Customers* submit orders over the Internet with the prime contractors via a shopping store/basket in a storefront environment.
- *The Prime* processes the order, which in turn triggers orders to suppliers, depending upon predefined conditions in the environment.
- *The supplier* takes the order from Prime and is involved in the movement of the final good to the customer as well as movements of subassemblies or raw materials to the Prime.

Finally, there is the shipping and information update problem and at each stage of commerce, the internal business systems of virtual components must be verified and updated.

To support this environment the basic infrastructure for the PREMINV must to consider two main modules:

The *Internal Module*, that represents the autonomous unit of a particular company and includes the complete structure of the company's information (databases, information system etc.) and all the internal decision making processes.

The *Cooperation Layer*, that contains all the functionalities for the interconnection between the company and the whole net / environment.

This general approach of the PREMINV platform is illustrated in fig. 3. A number of basic functional requirement to support the creation and internal operation of VE have been identified:

- Basic information handling functionalities
- Materials related functionalities
- Creation and configuration functionalities;
- New emerging services, as support to e-commerce, directories of products / services suppliers etc.
- Coordination functionalities.

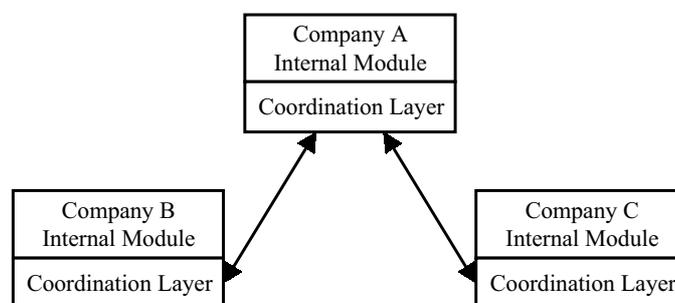


Fig. 3 PREMINV general approach

For the coordination layer (CL) there are a series of functionalities and supporting information for the interaction between a company and the VE in which is participating. The basic components of the CL can be defined as:

- *Distributed Management Information System*, that model and manage all cooperation support information;
- *Local Coordination Module*, interact with all other modules, handling “cooperation events”;
- *EDI Module*, for receiving and formatting orders-related messages in EDIFACT format;
- *STEP Module*, for handling technical product data;
- *Communication Infrastructure*, for handling all the communication with the other nodes in the network (protocols, privacy mechanisms etc.);
- *Configuration and User Interface*, for defining the structure of VE and the access rights of all its members.

Defining the PREMINV Platform is very important to know if EDI will be replaced or not by WWW – based or portal – based solutions. WWW – based approaches, with attractiveness of the multimedia aspects, are more adequate for human – initiated transactions.

3. FAVIR- International Virtual Network for the Future Enterprise, 1999-2000 (71206-CP-1-1999-1-SOCRATES-RO-ODL), 2000-2002 (71206-CP-2-MINERVA-RO-ODL)

The benefits of networked computers are accepted as the new educational technology starting point. The FAVIR Project thus emphasises the opportunities offered by the network-oriented society for diverse interaction. As a result virtual learning communities may emerge.

The project has integrated the partners (4 organisations in Europe - 3 universities and one organisation specialised in multimedia and new technologies), the pedagogical experience specific to each of them and disseminated ideas and experiences in ODL methods. This project has been carried out with the support of the European Community in the framework of the SOCRATES programme. The fields of activity are very important because they assure a virtual network hierarchy that corresponds to a part of the virtual enterprise.

In the first year the project has formed an active virtual team working on the Internet and seeks to improve ODL methods in the following fields: Computer Aided Manufacturing (France-INSA Lyon), Partnership and New Technologies (Greece), Web Project Management (Italy), and Optimisation of the Manufacturing Complex Systems (Romania).

We seek to develop a conceptual framework for a really collaborative ODL based on communication enriched by knowledge sharing to reuse previous problem solutions and capture new solutions. We try to develop a REAL PRODUCT in a VIRTUAL WORLD.

Teamwork skills are a prerequisite for success in these situations. Cooperation and collaboration are possible as functional working modes within the team. In cooperative groups, it is deemed equally important to give and to receive help. Learners understand that they can only reach their goal if the group, the community, reaches its goal (Johnson & Johnson 1996).

The main target groups are on-campus and distance education Ph.D. students wishing to complement the traditional engineering courses and to upgrade their professional knowledge's with the main to access to a new, modern qualification in the future active life. The enterprises are also interested in this form of learning for their personnel with the aim to renew the qualification of their engineers. It thus has a significant knock-on effect in professional training and development. This project is the first one partnership Socrates ODL to be supported from Romania and we are thus discovering the value of technology-based open and distance learning within the lifelong learning process of employees including ex-students as job seekers.

The main target groups don't necessary provide only from engineering domain. Like you can see the courses cover different domains d'activity. The program will be structured into four macro-areas of interest. To each of them a tutor will be assigned. Each area develops vertically and homogeneously a series of blocks of didactic units. The trainee will be able to follow modules "vertically"(one by one) or "horizontally" (by comparing courses relative to different subjects in a parallel way); this will occur by respecting didactic coherence limits. In order to make responsible the trainee and protect the site and professor's work, each user will have a limited number of accesses. It will be possible to access the lessons through a module of Name and Password application. If the name is contained in the archive and the password coincides with the provisional one, it will be possible to accede to the grill, which contains all the modules.

In the first year (1999-2000) we developed a web page, CD and booklet with the contents of the four courses, the description of ours universities and the level at where each partner is situated in an ODL structure.

The notion of dialogue as the basis of communication and interaction. Dialogue is a crucial element in the creation of any learning system and especially in establishing a collaborative networked learning environment.

So, the key principles of co-operative learning are positive mutual dependence between learners, interactive communication, individual responsibility, an emphasis on social skills, evaluation of one's own learning, and target-oriented working (Vähäpassi 1998). We have developed our project web page: <http://leo.optimum.pub.ro/socrates/favir.htm>. Our e-mail group address is favir@egroups.com.

Beginning with the second year (2001) we have a new partner from United Kingdom, Liverpool University College. His project team provides expertise in the use and development of computer-assisted learning (CAL) and computer based training (CBT). At the first meeting of this year University Hope College propose for evaluation the following aims:

- To evaluate the usability of the product;
- To ensure that established standards have been met in the design of the user interface
- Methods like: The level and style of interaction provided for the student; Navigation Models; Student support and feedback in undertaking tasks; Effectiveness of different media; Search facilities; Use of color; Use of text to convey information; Use of images; Use of metaphor; Use of affordance; Page layout and positioning.

We already became to prepare, to change, test and translate in English the classic courses into ODL courses. We also expect to carry out an evaluation of the effectiveness of the materials created and the outcomes of the students this will provide a suitable testing programme, with course revision, and publishing the project results on the Web page.

Inside each module every lesson will be interactive. Passing through, unit-by-unit, verification could be requested: verification will assign a score and permit to progress following the chosen study plan. Control program will show, in every moment, the reached level and the access number of each student. Each unit will contain didactic materials, lessons and issues. Didactic materials level of comprehension is settled on self-evaluation and multiple choice tests bases. When the cycle of the unit is filled in, the student will send a relation to the area-referring tutor for the evaluation and the passage to the following module.

So, after the end of this Socrates ODL project we can continue the activity and to transform it into a continuous ODL activity and not only to close the page of a new experiment.

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THE MASTER OF BUSINESS INFORMATICS PROGRAM PROVIDED BY VGU, A VIRTUAL ORGANIZATION

Karl Kurbel, Virtual Global University, School of Business Informatics

Background of the Program

The Internet has opened up a variety of new opportunities for higher education in general and for distance education programs in particular. While in the past physical media - like written course material, books and CD's - were usually employed in distance education, today we are on the threshold to produce entire programs in a completely digital manner and deliver them by electronic means. Furthermore, the Internet now allows both teachers and students to be physically distributed anywhere across the world and still participate in one program.

These new opportunities on the one hand, and several hundred person-years of teaching experience on the other hand, are the basis for an international master program designed by a network of university professors from Germany, Austria and Switzerland. This program is based entirely on the World Wide Web and other commonly available Internet services.

School of Business Informatics

The students' view of the institution hosting the International Master of Business Informatics (MBI) program is that of a "School of Business Informatics (SBI)". This school is virtual, i.e. it exists only in the Internet. It has its own virtual administration, a dean, and a faculty which is formed by the network of 17 professors from Central European universities.

Teaching Modes

Courses are based on Web supported teaching modes and electronic interaction. Although students will acquire some knowledge in a uni-directional manner first (e.g. by studying a video, reading a book chapter), regular discussions of problems, exercises, case studies, review questions, etc. are intended to help them better understand and reflect what they learned before.

Close interaction between teachers and students is considered a critical success factor for the program. Electronic media like chat rooms, bulletin boards, e-mail, etc. are used as communication channels for this purpose. Typical instruction modes are the following ones:

- Video courses (e.g. RealVideo, ASF). Students use plug-ins to download and watch the videos.
- "Narrated slide shows" (e.g. Powerpoint slides, synchronized with an audio track).
- Textbook courses with Web support.
- Software courses with electronic download/upload of exercises and solutions, resp.
- Case studies, projects, seminars: Papers are submitted electronically.

Outlook

The International MBI program is currently under development. Major obstacles to overcome are bureaucratic ones, for example how to bring the construction of a virtual school run by a network of professors from different states and countries in accordance with existing laws, rules, and regulations - and with the mentality governing traditional universities. The School of Business Informatics is planning to go into operation in winter semester 2001/02.

DESIGNING A DISTANCE EDUCATION LAW COURSE TO INCLUDE WORKPLACE EXPERIENCE

David Taylor, University of South Africa

Introduction – What is Street Law?

‘Street Law explains to people how the law affects them in their everyday life “on the street”’¹ How this is actually accomplished varies in each country and each institution.² Street Law was introduced for the first time in South Africa at the University of Natal in 1987. In 1999, when the course was offered for the first time as a distance education course at the University of South Africa (UNISA) it was already offered as a subject in the law degrees of eight South African universities.³

Many non-distance education institution courses used the excellent South African Street Law texts devised by David McQuoid Mason in the 1980’s as a basis for their syllabus.⁴ The texts were divided into subject specific categories and contained a programme (syllabus) of learning and teaching that subject category.⁵ Thus law students would not ‘redo’ subject specific substantive areas of law but would teach aspects of this substantive law to school children, and communities, being guided by the street law texts.

The intention is that law graduates would be do practical work during their studies bringing awareness of legal rights to in communities. The hope was that they would continue to do so after their studies. The trend was to grant recognition to street law as a clinical law course.⁶ A clinical trial course that attempts to focus on practical work presents a clear challenge for distance education, even though there is a great need for such courses.⁷

Going ‘distance’ with Street Law

In 1997 the UNISA faculty of Law approved⁸ the introduction of Street Law as an elective subject in the final or pre-final year of LLB study. The primary aim of the street law course is ‘to teach people about the laws that affect them in their daily lives’ to ‘encourage people to think about the law and how the law affects them’.⁹ Practical work would be done at a school, prison or community based organisation. Students would receive a letter of introduction and would have to identify and organisation they wished to work with. This did not expressly allow students to request that their workplace be the organisation in which they worked. The initial structure had a theoretical part, which dealt with substantive law, and practical component, which involved the preparation of lessons and materials; presentation of classes and the compiling a written evaluation of the programme

I was employed in 1997 to develop the course, including creating the study material and administering the course, in accordance with what the syllabus the faculty had approved. I was immediately dissatisfied with the course structure. It seemed from the course outline that the theoretical component of Street Law was intended to cover most of the subject specific substantive law already covered in the LLB. This may be a common flaw in distance education thinking – namely that theoretical content is too difficult (in a distance education context) to integrate with practical work and so should be kept separate.

I was not sure that the objectives of the course had been married with the substantive content. The objectives as I saw them were not to teach, or even brush up on subject specific substantive concepts taught during the law degree. Rather the objectives of the course were to; attempt to deal with the failure of higher education in laying the foundations of a critical civil society with a culture of tolerance, public debate and accommodation of differences and competing interests; and contributing significantly to a democratic ethos and a sense of citizenship perceived as commitment to a common good provide students with the skills that would assist them in their future careers as well as empower individual and communities. In essence all of these would entail practical work supported by (not separated from) theoretical work. To my mind this could be best achieved by focusing on issues and themes that give meaning to these objectives, rather than focusing on an overview of various aspects of our law. After all it was this shift of focus that was demanded by our new constitution¹⁰.

In 1998 I presented the new syllabus for (and received) approval of the faculty board meeting.¹¹ In the theoretical component the new syllabus shifted the focus off covering substantive law but rather identified jurisprudential themes that would support students when they did their practical work. Rather than redoing aspects of for example criminal or labour law students were required to study and investigate matters such as the 'counter-majoritarian dilemma' and the role of legislation in regulating power imbalances in society. These themes would help students deal with typical questions raised by the communities during practical work, for "How can the constitutional court stop the death penalty if that is what the majority want?" Some students contacted me to comment on how the theoretical work had been useful during their practical work. This feedback confirmed our decision that we were correct to shift the substantive law to support the practical component.

In the practical component the students received materials on how to perform the practical work (e.g. how to plan and present workshops - so called 'theory of practice'). The practical tasks were to; observe, prepare and present workshops and send in a self-made lesson plan for a workshop. The workshops they observed and presented had to be evaluated by the student themselves and also by a supervisor. The extensive evaluation forms contained closed and open-ended questions. The students also had to compare the sets of evaluation forms of each workshop given with each other and write up a final report.

Other street law programmes focused on young people.¹² We felt that this focus is important but should not be the sole focus, since there were other needs in specific communities and also students would need to be able to facilitate workshops to a variety of groups of people, not just children.¹³ Therefore accommodation was made for students to choose to do the practical work at their workplace and also a supervisor from their workplace. This in fact occurred, and in this way workplace skills of students could be evaluated as part of the course. For example a legal officer of the national defence force was able to use the training sessions that she gave new recruits as her practical work; a legal advisor for an insurance company was able to create a training session on new legislation which he presented to his non-legally trained colleagues. It became apparent that the ability to be able to integrate current work experience with studies is in fact one of the strengths of the program and in fact of distance education.

Students who were not working, or who were unable to use their workplace for their practical work were provided an opportunity and exposure in the work environment by the NGO Lawyers for Human Rights (LHR).¹⁴ Students could accompany a LHR staff member in their province to workshops given by LHR. Students gained valuable work experience and LHR benefited from additional volunteers and also being able to use students as a potential pool from which to recruit new staff.

Street Law speed bumps

Unfortunately LHR underwent radical staff changes and other internal difficulties as a result only two of the seven LHR staff could accommodate students. As an overall arrangement it was not as much of a success as had been hoped. But those students who participated in workshops (some approx. 400km away) telephoned me personally to express the profound experience they had.

An alternative plan had to be made for the students had not been able to go out into the field with LHR or who did not elect to use their workplace to do their practical. Materials on how to present workshops, were dispatched that to students. In addition students received an ad hoc video containing two workshops, which a trainer from LHR presented to schoolchildren. Students used the video lessons on the video as the observation aspect of the practical. Thus they had to watch the video, after reading the material on how to present a workshop, they then had to evaluate the lessons using worksheets included in their study material. This took care of the observation component of the course. We still had the difficulty of the practical presenting of the workshops to overcome as well as the component of the course where external evaluation, by persons supervising the practical could be addressed. The students who were not able to actually present a workshop attended a workshop session held by the university in which students were requested to present workshops to their fellow students with the lectures evaluating them.

How far we come?

From the brief description of the design and implementation of the street law course we can identify some lessons and outcomes from the process of implementing street law via distance education. In particular if we wish to integrate other learning environments of our students into distance education studies then:

1. Theoretical components should support the practical work done as much as possible.
2. Structuring a syllabus to allow for work experience essential –
 - 2.1. as it is personally enriching and academically enriching for the student
 - 2.2. as it strengthens the effectiveness of the programme
3. Including work experience can distinguish distance education learning from other types of learning.
4. Including work experience is a potential strength of distance education.
5. Contingency plans need to be made when including work experience.

Potholes on the road ahead

An attempt must be made to integrate more practical experience than has been offered, this is seen as an ongoing objective. More effective management structures are needed to manage, monitor and access the work experiences of students. Different types of and advanced financial planning is needed when dealing with workplace experience of students especially when considering contingency plans for such experience.

Conclusion – Travelling on with Street Law

Ten years ago McQuoid - Mason made this statement: ‘The incorporation of street law / allemansreg as part of the formal LLB curriculum is an exciting stage in the development of clinical legal education in South Africa. It offers law students an opportunity to contribute to the broadening of knowledge about the law among South African of all races and to encourage them to think about the type of legal system they would like in a future non-racial and democratic South Africa.’¹⁵

One important aspect of implementing the course successfully was remaining flexible about allowing students to do practical work within their work context. This helped to break the paradigm that the street law students could only be taught and evaluated in a fixed way which traditionally focused on contact tuition. Distance education has the potential to bring these lessons into the workplace directly enriching the student and her workmates. UNISA has begun the journey down the Street Law Road, that in itself is a start upon which we can gain some valuable insights and upon which we can build in the future.

We know it can be done, we know it can be enriching, we know it can give distance education an edge, so ease the car into first gear, release the break and slowly start moving forward down the road.

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³ McQuoid - Mason, Op cit note 1 349-350 For United States Law Schools which offer Street Law see Pinder K. A. 'Street Law: Twenty-Five Years and Counting' *Journal of Law and Education* Vol 27 No 2 (April 1998) 212 note 6

⁴ McQuoid - Mason, D. J. 'Street Law / Allemansreg as a Course Credit Towards the New LLB Degree.' (Junie 1990) *De Rebus* 374

⁵ McQuoid - Mason, D. J. 'Street Law / Allemansreg as a Course Credit Towards the New LLB Degree.' (Junie 1990) *De Rebus* 374; McQuoid - Mason, op cit note 1 and Centre for Socio-Legal Studies <http://www.csls.org.za/street.html>. Noted that many of the universities have introduced other aspects to their Street Law Program such as mock trials.

⁶ McQuoid - Mason, op cit note 5

⁷ Wessels, J. 'Informing people of their rights: Is that all there is to legal literacy?' *Codicillus* V 38 No 2 (Oct. 1997) 50

⁸ University of South Africa, Report of a meeting of the board of the faculty of Law held on 19 March 1997, Part II. 2 and B5-B8

⁹ Ibid

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¹² McQuoid - Mason, op cit note 1 at 349 and 351 see too Lubinski, B 'Street Law: Where Kids learn the basics of Law and Life' *Texas Bar Journal* v 58 (June 1995) 612

¹³ Wessels, op cit note 8

¹⁴ <<http://www.LHR.org.za/>>

¹⁵ McQuoid - Mason, op cit note 5

THE LAB OF TOMORROW PROJECT

A CONSTARCTIVIST APPROACH IN SCIENCE TEACHING THROUGH THE EMERGING TECHNOLOGIES

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Introduction

[Science, whatever be its ultimate developments,
has its origin in techniques, in arts and crafts...
Science arises in contact with things, it is dependent
on the evidence of the senses, and however far it seems
to move from them, must always come back to them.]
B. Farrington, Greek Science, 1949

There is sufficient evidence to suggest that both the persistence and the quality of learning are highly enhanced when the student is actively participating in the learning process. This is the essential and widely accepted message of “constructivism”¹ [S. Papert, 1994, M. Resnick, 1993]. Juxtaposing this ideal with the current reality of organized learning in school environments creates the impression that the school is not connected at the desirable degree with daily life experiences.

One particular and most striking example is science teaching. Throughout history science has advanced through observation, inspection, formulation of hypotheses, testing of the hypotheses by means of experiments and collection of data, rejection or acceptance of the hypotheses, formulation of topics for further research. It seems that in schools this process of acquisition of scientific knowledge gets reversed. Science is presented as a coherent body of knowledge, the experiment is the illustration of the phenomenon, and the questions are answered even before they are asked. The result is that the student acquires short-term knowledge targeted at standardized test questions, and in many instances this "forced and inefficient" learning lacks on long term sustainability.

Possible pragmatical remedies have been proposed. Regarding to [E.v.Glasersfeld, 1995] the constructivist point of view has been very fruitful to develop science instruction. In this model knowledge acquisition is only a matter of individual mental activities. But, constructivism [R. Duit, 1995] in its pure, so-called “radical” version is also discussed controversially. The instructional component is missing in the model and therefore it is very difficult to derive investigation methods and codings which are able to represent the instructional influence upon learning processes. Thus, since the early 90s a pragmatic interim position was discussed, named by [M.D.Merrill, 1991] as “instructional design of the second generation”. It is seen as integration of constructivism and cognitive theory. It accepts learning as a process of individual cognitive construction and states the dependence of this process on adequate learning environments [B. Weidenmann, 1993, S.J. Derry, 1996]. Even models of situated learning [H. Mandl et al., 1997, W.M. Roth, 1995] can be seen as a combination of these two approaches, taking into account the learning situation and motivating and communicative aspects, which is an obvious weakness of radical constructivism. As it turns out the main link missing in the learning process is that students do not learn sufficiently through experience but through a systemic model based approach, which should be the culmination of learning efforts and not the initiation. A particularly disturbing phenomenon, that is common knowledge among educators is that students fail to see the interconnections between closely linked phenomena in e.g. biology and chemistry, or fail to understand the links of their knowledge to everyday applications. In most cases the physical quantities have become abstract for the students and the experimental set-ups alien or distant to every day experience. Students are early faced with two separate fields: “school science” and every day life’s “rules and principles”. Such separation commonly leads to

¹ Also referred to the literature as constructionism [E.v. Glasersfeld, 1995, R. Duit, 1995].

the formation of misconcepts [D. Nachtigall, 1991]. “School science” explains adequately “school science lab phenomena” while preconceptual or misconceptual reasoning explains daily phenomena. Various approaches try to bridge these two fields [D. Nachtigall, 1992]. They converge in the wide usage of every day materials and means in the classroom, something relatively easy in primary school level. In higher levels this becomes less effective since the phenomena and the concepts under study (like acceleration, momentum transfer or energy conservation) are more abstract.

In such cases technology is providing some help with the supply of educational scientific instruments and software. Both the power and the problem with modern scientific instruments used in the school laboratories are reflected in the term “black box” that is commonly used to describe the equipment. Today’s black-box instruments are highly effective in allowing students to make measurements and collect data - enabling even novices to perform advanced scientific experiments based in most of the cases on advanced simulations. But at the same time, these black boxes are “opaque” as their inner workings are often hidden and thus poorly understood by the users. Furthermore they are bland in appearance making it difficult for students to feel a sense of personal connection with scientific activity. “To many students a lab means manipulating equipment and not manipulating ideas” [V.N.Lunetta, 1998]. Electronics and computational technologies have accelerated this trend, filling science laboratories and classrooms with ever more opaque black boxes.

Paradoxically, the same electronics technologies that have contributed to the black-boxing of science can also be used to reintroduce a vigorously creative and aesthetic dimension into the design of scientific instrumentation - particularly in the context of science education.

The **Lab of Tomorrow** project is introducing innovation both in pedagogy and technology. It aims at developing tools that will allow for as many links of teaching of natural sciences as possible with every day life. It will allow the student to link i.e. physics with “physis” (Greek word for nature), biology with “bios” (Greek word for life) and so on. The Lab of Tomorrow project is developing a new learning scheme by introducing a technologically advanced approach for teaching science through every day activities. Science deals with the study of nature and the world around us, so teaching science cannot be separated from daily experiences resulting from student’s interaction with the physical phenomena. The connection of tangible phenomena and problems provides students with the ability to apply science everywhere and not only in specially designed experiments under the laboratory’s controlled conditions [D. Nachtigall, 1992].

In the Lab of Tomorrow project the re-engineering of the school lab of tomorrow is proposed by developing a new learning scheme based on the production of computational tools and project materials that allow high-school students to use their every day life environment as the field where they will conduct sophisticated experiments experiencing the applicability of the theoretical background given at school.

The partnership proposes the development of a wearable technology, a series of “artefacts”, called **axions**², which will allow students to develop investigations drawn from their everyday activities and which, in many cases, involve data collection over extended periods of time. The axions embedded in every day objects (for example an accelerometer may be embedded inside a ball) or in cloths (for example a heart pulse meter may be embedded in a T-shirt) will be used in order to collect data during students’ activities. Important factors of their design are ergonomics and economy, so they will not stay on a test bench nor used by a small number of users. The data collected by the axions will be presented with the use of advanced programming tools compatible with graphing and analysis software components so that students can easily investigate trends and patterns and correlate them with the theory taught at school.

² The partnership has chosen this specific name for two reasons. In physics axion is a hypothetical elementary particle. Even though the axion -- if it exists -- should have only a tiny mass, axions would have been produced abundantly in the Big Bang, and relic axions are an excellent candidate for the dark matter in the universe. The second reason is the word game between axion and action.

Project's objectives

The objectives of the Lab of Tomorrow project are the following:

- **Development of a pedagogical framework that will allow successful application of the emerging technology in everyday learning.**

The proposed project will develop an innovative educational approach, which will guide students through the learning process in science, by using day-to-day activities as possible subjects of both formal and informal investigation. Many daily activities can be seen from a different point of view, the conditions of the Lab of Tomorrow, where the every day reality, as well as the magic of science will return. With the engagement in inquiry-rich experiences students will gain deeper insight into the nature of the phenomena under investigation. The goal is to shift away from classroom learning to “daylong” learning and to use the axions to facilitate that shift. The project's implementation will include **three cycles of school-centered work** in real school environments. For the first two cycles an adapted curriculum will be developed around a solid educational framework that captures the main learning objectives of the project, while during the third (students' project assignments) the pedagogical theories of modelling and constructivism will become a school practice. The collaboration aims at the end of the project to propose a systematic, full and practical guide for the wider introduction of the embedded artefacts in school life.

- **Enhancement of a constructionist approach in science teaching.**

Usually pre-designed experiments are used in science teaching. In the framework of the proposed project students will be able to use the axions and the wearables to set up their own experiments, which they will conduct autonomously. In this way the procedure of scientific inquiry is fully simulated: formulation of hypothesis, experiment design, selection of axions, implementation, verification or rejection of hypothesis, evaluation and generalisation are the steps that will allow for a deeper understanding of the science concepts. The partnership believes that the proposed approach will act as a qualitative upgrade to everyday teaching for several reasons:

Motivation: Students are more likely to feel a sense of personal investment in a scientific investigation as they will actively participate in the research procedure and will add their own aesthetic touches to their intelligent toys and cloths.

Extending the experimentation possibilities: The axions can serve as spurs to the imagination, promoting students to see all sorts of daily activities as possible subjects of scientific investigation. The proposed procedure will be freed from the pressing time limitation of the teaching hour.

Developing critical capacity: Too often students accept the readings of scientific instruments without question. When students will get involved in the proposed activities for example by measuring their physical parameters as they are playing, they should as a result develop a healthy scepticism about the readings and a more subtle understanding of the nature of the scientific information and knowledge.

Making connections to underlying concepts: In the framework of the project's application to the school communities, students will be asked to design their own projects. During this procedure students will figure out what things to measure and how to measure them. In the process they will develop a deeper understanding of the scientific concepts underlying the investigation. If students use a wearable thermometer, for example, they naturally encounter (and make use of) the concepts of thermal conductivity and heat capacity.

Understanding the relationship between science and technology: Students participating to the project will gain firsthand experience in the ways that technology design can both serve and inspire scientific investigation.

- **Development of new educational tools and learning environments.**

The partnership proposes to develop a family of tiny, fully programmable computational devices, the **axions** that can be embedded in everyday objects and cloths. Axions will receive information from sensors, communicate with one another and transmit the collected data to a base station. As an example, students could use a “wearable instrument” that analyzes the relationship between a person's heartbeat

and their level of exertion throughout a day or they will wear T-shirts with embedded axions in their ball games and will use a "clever" ball to play. Many phenomena in mechanics, chemistry and biology can be addressed through the daily analysis of the data that will be collected by these intelligent components. For instance the law of energy conservation can be observed by the simultaneous measurements of aggregate heat emission on the human body and the data on "notions" of energy collected by the ball (e.g. total distance travelled, average speed). A **User Interface** will be developed to be an adding tool that will bridge science teaching and technology. These software educational tools will support teachers and students in the new learning environment and will be at the same time compatible with graphics and analysis software components, so students can easily investigate trends and patterns in the data they collect. Students will be able to graphically view all quantities under study and the data correlations through a scatter diagram on the computer screen. This specially developed interface will also be used for data download (transfer from the "axion" to the PC), analysis and presentation of data, in an organized educational way. The main emphasis on the user interface is the improvement of the interaction between students and the universe of digital services. The project also has an equally important goal at the level of the social dimension of learning. It will be attempted to overcome the limits of the classroom by having a network of schools gathering the same type of data and asking the students to compare e.g. the effect of the different court sizes on the total amount of energy consumed, the effect of the number of players on the average heat emission and the energy transformed into kinetic energy, the effect of different shoe brands on the efficiency of the energy transformation process. Research will thus become a collective process, whereby the interactions will not merely be at the level of data analysis but at the level of the formulation of hypotheses, exchange of opinions, announcement and communication of results using the collected data that will be regularly submitted to a Web database.

- **Equal and parallel development of pedagogical and technological innovations.**

The involvement of the pedagogical community in the development of the innovative technology is relatively small. In most cases the educational experts are just criticising, usually negatively (e.g. video games, hand held computer games). Furthermore teachers and students are excluded from any contribution to this development. The aim of the proposed project is that the technological innovation is designed with educational targets and criteria. In the Lab of Tomorrow project students and teachers will come together with science researchers, psychologists, and technological and educational experts to re-engineer the lab of the school of tomorrow. The pedagogical and technological innovation of the proposed project will evolve together during the project's implementation and the experts from both fields will be in continuous interaction receiving and providing input.

- **Development of a concrete evaluation scheme of the educational and technological aspects**

Evaluation of both aspects of the project will be done according to well-defined methodologies. The aim is to develop a better theoretical framework on how different types of tools and instruments support different types of thinking, reasoning and understanding. The research process that will be adopted in order to study the impact of the proposed educational approach will include both measurements (achievement tests) and on field observations (video captures of the activities). In the educational aspect there will be a complete evaluation of the student's learning and of the pedagogical framework, while in the technological aspect there will be a complete evaluation in the quality, the ergonomics and the strainability of the products (following ISO standards). The educational value of the advanced technological tools will be evaluated during the three cycles of school-centered work. Emphasis will be given throughout the project work – design, re-design and evaluation – to ethical considerations. The intention of the partnership is not to impose an ethical view, but rather pursue participatory ethics. Ethical considerations and ethical standpoints are tangled in the project at all levels taking heed of student's co-design, but also of children, teachers and parents voices and emotions when addressing the issues of moral determination and research of ethical standards. In the subject of combination of didactics and technology the project will try to raise awareness for issues like: what is the most appropriate mix of physical (equipment, toys etc) and virtual (PC, video game environment) objects in learning activities? From this accurate evaluation scheme arguments in favour of the need for wider spread of new practices in secondary education are expected to arise, arguments that will be distributed through an extended dissemination plan.

Educational concepts

Recent studies normally describe science lessons by means of negative indicators. Students behave passively and their learning outcome is mostly not seen as a basis of the acquisition of new knowledge and for further activities in the area [J. Baumert et al., 1997]. Students seem to be far away from skills proposed by “scientific literacy” to become reasonable and responsible acting citizens [H.E. Fischer, 1993], meaning in short they are far away from presenting, discussing and criticising science related topics of society. The Lab of Tomorrow project will contribute in changing the present situation by implementing the following innovations:

- **Teaching science through every day activities.**

The partnership believes that students can come to view the development of scientific experiments and projects as a craft that rewards dedication and precision but simultaneously encourages a spirit of creativity, exuberance, humour, stylishness and personal expression. Moreover the partnership believes that with the appropriate computational tools for developing their own projects, students can, over time, develop a sense of confidence and self-empowerment; they can view scientific investigation as a process in which they can take part, day-to-day, creatively and pleasurably. Students through a sequence of steps involving, data accessing, plotting data on a graph, creating a mathematical model to fit the data and relate the graph with the motions of the axions provided by the advanced user-interface, will have a deeper inside of the phenomena and the scientific methodology. One of the major goals of the partnership is facilitating students to become more fluent in creating their own scientific investigations based on their daily activities. It will be considered as a major success of the proposed project if students, during the third cycle of school-centered work are more likely and more able to design, implement and evaluate their scientific experiments using new tools (even very simple combinations of axions) for exploring phenomena in their everyday lives. For example an axion-accelerometer placed in a student’s shoes could be used to take a rough measurement of the wearer’s running speed; or it could be used to measure the student’s acceleration at the outset of a jump and hence to get an estimate of how high the wearer is able to get off the ground. Such projects suggest the use of wearable devices as means of measuring aspects of one’s own body and its functioning (e.g. pulse rate, blood pressure and body temperature measurements). A wearable instrument allows measurements to be taken over wide range environments and over long periods of time, and it encourages students to blend small, subtle and personally meaningful acts of scientific interest into their day-to-day activity, expanding the experimentation activities out of the conventional lab to the real life environment.

- **Reinforcing inter-discipline approaches.**

The main link missing usually in the learning process is that students do not learn sufficiently through experience but through a systemic model based approach, which should be the culmination of learning efforts and not the initiation. A particularly disturbing phenomenon, that is common knowledge among educators, is that students fail to see the interconnections between closely linked phenomena or fail to understand the links of their knowledge to everyday applications. Therefore, in recent years, there is a clear focus on interdisciplinary education. This approach supports that educational experiences should be authentic and encourage students to become active learners, discover and construct knowledge. Authentic educational experiences are those that reflect real life, which is multifaceted rather than divided into neat subject-matter packages. Indeed, interdisciplinary instruction exploits the natural and logical connections that cut across content areas and is organized around questions, themes, problems, or projects rather than traditional subject-matter boundaries. Artificial barriers among subject areas are eliminated and students are given a broader context for solving real-life problems, which demands the development of analytical, interpretive and evaluative skills used in many subject-matter areas. This kind of learning is definitely of greater value to students. The project will develop these results in close interaction between the different disciplines. On the other hand, teachers are faced with a real challenge. Having specialised in an academic discipline may cause frustration to them when it comes to creating interdisciplinary, cross-curricular activities. Such activities demand considerable knowledge in many areas, which they may lack. Collaboration with their colleagues may help them overcome this challenge, develop positive attitudes to interdisciplinary learning and gradually adopt it and make it part of their teaching practice. Educational context of Lab of Tomorrow is not transmitted in a theoretical way but rather in a biomatic way in the form of a real life experience. Interdisciplinary is crucial towards enhancing the effectiveness of education, since it provides a unique way of strengthening learning processes, such as discovering

analogies, similarities etc., while providing topics, which are inherently closer to real world problems. Playing is a highly interdisciplinary subject and its implications give topics for discussion in Physics, Chemistry, Biology and Health Sciences, expanding the learning resources for students.

- **Promoting behaviour and process oriented learning.**

After the familiarization of the students with the axions, **projects** will be assigned to them. They will be let free to approach their every day situations they want to study. Now the students will be requested to develop real problem solving practices, letting themselves free to attack situations and study them using the technique of “guerrilla approach”. By using the axions to compose their own scientific inquiring strategy, the partnership expects students to be able to engage in more meaningful and motivating science-inquiry activities. In this way these assigned projects will promote creativity through new forms of content combining highly visual and interactive media with the use of innovative ways of design, delivery, access and navigation. The versatility of the tools and results is one of the most compelling factors of the project. The students will be encouraged to present and further develop their results in settings that go beyond school boundaries. Additionally, with the assigned projects students will not see electronic equipment and measuring devices as black boxes, but as something that can “take it apart and built it again”. In this way the proposed project takes advantage of the natural tendency of children and youngsters to pursue pleasure and research in their activities.

Technological innovation

The trend of technology calls for smaller and smaller gadgets up to the point of the “disappearing computer”, an ultimate goal of the proposed project that will build in ordinary items sensors and other measuring instruments and “disappear” them into clothes, toys and furniture thus creating the “intelligent clothes”, the “intelligent toys” and the “intelligent furniture” all connected with a small wearable computer. By definition wearable computers will be used in environments, which differ dramatically from the normal domains of computer use. Wearable computers represent a new and exciting area for technology development, with a host of issues relating to display, power and processing design still to be resolved. Wearable computers also present a new challenge to the field of ergonomics; not only is the technology distinct, but the manner in which the technology is to be used and the relationship between the user and computer have changed in a dramatic fashion.

There has been rapid development in the field of wearable computers in the past five years. Publication of papers on wearable computers at ACM's (Association for Computing Machinery) special interest group on human-computer interaction (CHI), series of conferences in the IEEE (Institute of Electrical and Electronics Engineers), journals suggest that the concept has achieved academic respectability. Commercial products have appeared in recent years, e.g., Xybernaut Corporation and Teltronics, Inc., both produce Pentium processors that can be worn by users. With the recent announcement of the IBM wearable computer (in addition to development work by major telecommunications organizations), it would appear that the concept of the wearable computer has matured.

Unlike desktop computers, **wearable computers** have the potential to “see” as the user sees, “hear” as the user hears, and experience the life of the user in a “first-person” sense. They can sense the user’s physical environment much more completely than previously possible, and in many more situations. This makes them excellent platforms for applications where the computer is working even when you aren’t giving explicit commands. Health monitors, communications systems, just-in-time information systems and applications that control realworld devices for the user are all examples of these contextually aware applications. In the case of the desktop computers, the users’ primary task is working with the computer. With wearables, most of the time the user is doing something besides interacting with the computer, e.g. in the Lab of Tomorrow project students might playing in the school yard or at home as the axions will collect data.

Intelligent clothing has a series of basic capacities that can be brought together in a flexible way to realize particular functions, with or without the use of add-on modules. In this sense clothing is functional, while intelligent clothing is functionalizable. Whether this is realized using simple configurable base-functions or automatic context sensitive configuration is a matter of sophistication rather than a fundamental difference. During the development of intelligent clothes, usability is an important issue. Up until now, when someone wants to be reachable, one has to take devices along. This can cause problems concerning flexibility, mobility. By integrating these devices into the daily clothing the person, has always the possibility to use them. On the other

hand the person should be able to decide which device he wants to use. Therefore he needs to have control over his clothes. The intelligent clothes should in fact not interfere the user, but help him and **expand his possibilities**. The user should therefore fully understand them. The user interfaces should fulfill this usability item, by its design. Another important item is of course the user itself. He has to be protected and should not take any risk on wearing these clothes. The integration of the electronic parts needs a lot of research on making them completely safe.

To achieve all of this, the Lab of Tomorrow project will look into the basic technologies for realizing a generic notion of intelligent clothing as being **functionalizable**. Just like personal computers are generally functionalizable by software (i.e., programmable), intelligent clothing will make the diverse characteristic and capacities of clothes configurable and thus the dress functionalizable.

Wearable computing may be able to usefully implement designs similar to those used in other embedded control systems. For example, many new cars are now controlled by networked microprocessors and microcontrollers. The microcontrollers receive signals from sensors around the vehicle and report changes in expected value, i.e., usually once a specified threshold has been exceeded, the microcontroller sends a signal to another device. Similar distributions of low-cost processors could usefully add to the fail-safe capability of wearable systems with a serial or parallel body LAN (local area network) networking protocol, testing system integrity and making the best use of available resources. Wearable computing can be seen as a new embedded system application. Ideally, processors will operate reliably in relatively hostile environments with minimum power consumption. If systems are to be successful, robust, lightweight, low-power solutions are required.

Clearly the conclusions of the proposed project will be grounded in contemporary technology. However, it is proposed that the Lab of Tomorrow project might stimulate exploration and research beyond the current limits of software engineering and systems development, and continue the debate as to what is meant by the term wearable computer. All of these results are integrated in the technological report, one of the main deliverables of the Lab of Tomorrow project toward intelligent clothing. Demonstrations and prototypes will be developed in collaboration with students, schools, designers and experts in the field of ergonomics of the wearables.

Bridging the gap between pedagogy and front-end technology

The digital revolution will (or already has?) transform the world of toys and play. Technologies are increasingly incorporated into artefacts for children. An example that changed the way of seeing things is the software pets that have become a worldwide smash success, causing also a great deal of discussions. Old toys will become smarter. New toys will become possible. All toys will become connected. The Lab of Tomorrow project proposes the real involvement of school students in the design, development and first use of new, technologically advanced ideas in playing. With the good starting point that playing is fun the project will bring the front-end technology in to the classroom and attract the interest of young people, providing in parallel with the introduction of technology new educational approaches. There is also a tendency from the part of pedagogy community to criticize the toy industry for not creating enough pedagogical toys. The Lab of Tomorrow project gives to this community the opportunity and the challenge to design new "toys" and subsequently be criticized. In the Lab of Tomorrow project students and teachers will be involved as designers and not just as end users.

The Lab of Tomorrow project will adopt an **activity-based design methodology**. It has been recently questioned [*C. Baber et al., 1999*] whether the contemporary approach to the design of computer applications can be sustained for future technologies. He suggests that a primary reason why the desktop metaphor remains in vogue is that it allows designers and manufacturers to strive for the production of multipurpose products, i.e., products and applications that can be used for any job in any office. This seems to make good business sense, with most people finding most of the functions useful. Nevertheless, it also leads to claims that the majority of the functions offered will not be used by the majority of users [*D. Norman, 1998*].

Norman's proposal [*D. Norman, 1998*] is that future computers will offer restricted function sets, and that people will select the function set most appropriate to their defined requirements. He calls this "**activity-based computing**" since computers will be designed to support specific activities. This would mean that the wearer would have less equipment to operate and carry, and it could also mean that interaction with the computer could be performed via familiar objects and products.

The partnership believes that activity-based computing extends the basic assumptions of user-centered design and requirements engineering, because it allows considering the architecture that might be appropriate for a specific wearable product. The approach, which will be adopted in the framework of the project, is to use scenario-based design methods as a means of defining suitable applications of wearable technology. A series of lesson-plans (scenarios) will be developed. These series of lessons will be implemented in the science curriculum of the participating schools during the first two cycles of the school-centered work. At the final cycle of the school-centered work students and teachers (having been familiarized with the idea that scientific investigation is a process in which they can take part, day-to-day, creatively and pleasurably) will have the opportunity to design their own scenarios for exploring phenomena in their everyday lives. These new ideas will provide input for the development of new artefacts.

Evaluation – Ethnographic research

The evaluation of the proposed didactic approach will be performed on three aspects: evaluation of student's learning, evaluation of the underlying pedagogical framework and ethnographical evaluation.

- **Evaluation of the student's learning.** In assessing student's learning, student's engagement in science as inquiry will be primarily examined. The partnership believes that the activity of designing projects and experiments provides a powerful way for students to become meaningfully involved in scientific inquiry. In this way the dimension of self-expression will be introduced, something that is often missing in science education. Prompting students to see all sorts of daily activities, as possible subjects of both formal and informal scientific investigation will increase their motivation. Furthermore, the proposed approach will help students in developing critical capacity and deeper understanding of the scientific concepts underlying the investigation. Finally students will gain firsthand experience in the ways that technology can both serve and inspire scientific investigation.
- **Evaluation of the pedagogical framework.** The major theoretical issue underlying the proposed project is whether the implementation of the emerging technologies (e.g. wearables) could offer a qualitative upgrade to the science teaching at the high school level. In such a case the introduction of technology would not act as a substitute of the conventional teaching but rather as an add-on that has to justify its introduction through the qualitative upgrade it offers to everyday school practice.
- **Ethnographic evaluation.** The project will take advantage of the different school environments across Europe and will study the attitudes of students and teachers with different cultures towards the implementation of IST in education as well as the attitudes between students themselves coming from different countries.

Conclusions – Future plans

In the framework of the project the educational and technological aspects will be researched and worked on together in an open and exploratory fashion, encouraging innovation. The new ideas, concepts and technologies will be tested and evaluated in relation to real school environments. To facilitate the take-up of both educational and technological elements of the project, effective ways of promoting and sharing experiences gained will be employed. The synthesis of the partnership safeguards the needed expertise in order the goals of the project to be achieved and the proposed tasks to be accomplished. Following the echo from IST'99 session "Children shaping the future" and the hope that the passionate debate about children and how their voices can bring freshness and new meaning in the development of a better IT world will not remain a rhetorical exercise, in the Lab of Tomorrow project students and teachers will come together with researchers, psychologists, designers and technologists to re-engineer the lab of the school of tomorrow. This will be achieved by developing a new learning scheme based on the production of computational tools and project materials that allow high school students to design their own scientific projects.

The project will include three extended periods of school-centered work. These trials are not only meant for evaluation purposes (technological and pedagogical) but involve teachers and students to giving direction to the project and its technological and pedagogical results. The aim is to help both teachers and students reach beyond "cliches" to the areas in which they can make **the most valuable contributions**, and **potentially increase their role on the world stage afterwards**. To assure maximal usability of the new tools, optimal adaptation to the local environments and realistic evaluation of the pedagogical effects,

the Lab of Tomorrow project will use a heavily **student-center approach**. This will be achieved by using five real school environments in Austria, Germany, Greece and Italy.

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DNA FOR A GLOBAL CURRICULUM: DESIGN ISSUES IN INTERNATIONAL COLLABORATIVE COURSEWARE DEVELOPMENT FOR BIOTECHNOLOGY

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Overview

The international Virtual University Education project (VIRTUE) is a unique collaboration for marine biotechnology research, curriculum design and delivery, and outreach to the public. Funded by the Knut and Alice Wallenberg Foundation in Stockholm, VIRTUE supports a partnership among University of Bergen, University of Göteborg, and University System of Maryland. In this paper you will learn about the challenges in building a modularized, problem-based learning experience online in biotechnology. We will draw examples from a bioinformatics course that includes genome blasting, designed for undergraduates in several countries. Students come from biological science or computer science fields. The final design is intended to scale up for broader international course delivery or scale down to modules that can be incorporated into existing courses at universities or in the workplace. We will share our current view of the "DNA " of such a project, focusing on what we have learned as we unravel the complexities of international collaborative design and delivery of a Web-based course. At the conference we will illustrate with the course itself.

International Collaboration through VIRTUE

VIRTUE's curriculum is built around its nine collaborative scientific research projects and the related learning needs of students. Students who have taken VIRTUE courses are enrolled in one of the two Scandinavian universities or in one of the University System of Maryland's institutions. However, it is envisioned that this curriculum will be offered in the future to a global population. Since the beginning of the project, video-conferencing has been used extensively to support scientists' discussions as they collaborate on research. It also has been the principal vehicle for scientists to teach students in all three countries simultaneously. Recognizing the limitations of this technology as time zones stretch around the globe, the project began to supplement these video lecture series and seminars with online student interaction. During this past year the project has begun development of fully digital courses in two areas: aquaculture and bioinformatics. The University of Bergen has taken the lead in managing the development of an aquaculture course. The University of Maryland Biotechnology Institute is leading development of the bioinformatics course. In both instances faculty from all universities are contributing to planning and content development. The courses are offered in English.

Problem-Based Learning in Online Environments

Marine biotechnology encompasses many of the world's most critical environmental and health challenges of today. The goal of the VIRTUE educational component is to educate young scientists and to reach out to industry and public education to engage citizen commitment to addressing these challenges. The VIRTUE curriculum springs from its joint marine research projects. The intent is to create curricula that shares this cutting edge of science and learning with students at the university, in industry, with appropriate outreach to pre-university education. In searching for a meaningful approach to organizing learning for distance education students online we chose a problem-based learning design. While there are many forms of problem-based learning, most espouse these ideas.

- a) A complex, real-world problem with more than one possible solution is devised to evoke curiosity and puzzlement for the student. The student explores and masters the content through the process of seeking solutions to that problem. In PBL, problems are not merely an assignment to test or practice previously acquired knowledge; instead PBL situates learning in a meaningful context.
- b) Inquiry-driven learning is based on "learning issues" that students identify in light of their gaps in knowledge or understanding when confronted with a problem to solve.

- c) Students are encouraged to take ownership of their own learning and manage learning activities. In small groups or teams students may also negotiate ways to share learning responsibilities and activities.
- d) As students work with others to solve problems, they present multiple perspectives for consideration or negotiation. By weighing, refining and testing alternatives, they are engaged in dynamic knowledge construction, often simply referred to as “meaning-making.” This interaction builds shared understanding, while helping to integrate new knowledge into one’s prior knowledge.
- e) Reflecting on the learning process itself helps students develop meta-cognitive skills. As they become more aware of how they are learning, they can more easily master new ideas and solve problems more effectively in future education or at work. Students are also encouraged to consider how their new knowledge might apply in other situations or contexts.

This constructivist approach fosters critical analysis both of problems themselves and sources of knowledge or learning resources. It requires students to articulate and refine ideas as they work with others to develop solutions. This reinforces memory and facilitates recall later. (Barrows, 1984, 1996). Given sufficient time students also develop skills in collaborative work. Learning is not confined to the focal problem, but students learn to use higher cognitive skills of synthesis, evaluation, and adaptation to new contexts and problems. (Boud, D., et al., 2001); Savery, J.R., & Duffy, T.M., (1995); Posner, G.J., et al., 1982; Strike, K.A., & Posner, G.J., 1992).

Most of the theory and practice of PBL is classroom based, while VIRTUE is preparing distance education Web-based courses. Little has been written on PBL in the online environment. Cardean University (the UNext business school collaborating with University of Chicago, Columbia University, Carnegie-Mellon University, Stanford University and London School of Economics) has adopted a PBL approach for most of its MBA courses under the guidance of Thomas Duffy. (2000) Courses are based on content provided by a professor from one of the cooperating universities, but this content is transformed into an active PBL learning environment by specialists and professors at Cardean. The result is a resource-rich multimedia environment online where learners are engaged around a complex, real-world business problem for five to six weeks. Intermediate deliverables guide students through the complexities of the problem, but they are free to explore the rich resources online on their own. They may select from several reading resources, see problems worked out step-by-step, hear short video clips by the authoring professors explain difficult points, manipulate animations or worksheets configured for particular calculations, and test their learning with self-quizzes. Throughout the course the instructor actively facilitates discussion in a group conferencing environment. In addition to responding to student queries, the instructor stimulates discussion to support both the management of learning processes and the mastery of content.

What is missing in both the Cardean and VIRTUE PBL design is an emphasis on student interaction to define “learning issues” and to subsequently self-organize for collaborative research. While online dialogue through computer conferencing can be very effective in fostering student collaboration, the time frame for many online modules is very tight. In the VIRTUE program the authoring professors do not feel that they have enough experience or development time or tools to organize an online course for contingencies that such an approach would generate. We foresee this as a long-term objective. Perhaps it will first be implemented with students who already have experience in online learning. The current work of the InterMedia project at the University of Bergen and University of Oslo illuminates the importance and possibilities of bolstering this aspect of PBL in the near future. (Arnseth, H.C., et al., 2001). Problem based learning in the online environment is just emerging.

Instructional Design Challenges

The VIRTUE curriculum teams have several challenges in instructional design.

1. Biotechnology, and especially bioinformatics, is continuously evolving. Any design for course delivery must accommodate rapid and frequent change. Not only will updates be necessary between offerings of the course, but also the course site will be dynamic during the teaching of the course. Such updates need to be easily flagged from one semester to another and tracked because of numerous contributors to the content.

2. Faculty members' experiences with teaching online have been very limited and they share no mental models about how to set up or conduct learning in for fully Web-based courses.
3. While faculty frequently teach using problems, some of the assumptions of PBL aren't familiar. Shifting from using problems to reinforce learning to using open-ended, complex problems as central organizers for learning is not simple, especially in an online environment.
4. Most of the faculty members have had little experience facilitating problem-based learning and no experience in the online environment. While all have used the Web extensively to supplement face-to-face or synchronous interactive video class, few have facilitated online dialogue. Without this experience, they have less confidence in the possibilities of effective online discourse in all phases of PBL. Nevertheless they are committed to shifting to an inquiry-oriented, constructivist approach using a problem-based learning strategy. Two-way time-shifts are emerging as a little understood challenge: the ability to respond speedily is offset in groups by lapsed time among responses, so that the rhythms of synchronous discourse are disrupted. Learning to manage this dynamic offers increased flexibility for the instructor, but it also occasionally feels like students are omnipresent.
5. Instructional design resources have not been identified and used at all VIRTUE universities despite the presence of such resources at each institution or system. While media and communications support have been integrated into the project, instructional design was not foreseen as a necessary partnership. Where it is available, it is more consultative than operational.
6. Instruction is not a top priority of research scientists' agendas. Although committed to sharing new knowledge and research results, scientists' schedules are heavy. It is difficult to find time when design decisions can be considered in the full context of the course and its new paradigm.
7. Curriculum for international use usually is developed in one venue and then opened up to international students or exported for use. Even when the developers are culturally diverse, they are either co-located or have a managing hierarchy. VIRTUE, in the Scandinavian tradition, was conceived as a collaborative project with the three institutions sharing decision-making equally at all levels. The Curriculum Committee is composed as three institutional representatives. Even when decisions are made with teams of authors, the institutional contexts in which these decisions get carried out often diverge and expectations are not met. Collaborative curriculum design for innovative instructional practices has proved to be a slow process.
8. The students are international, even within individual participating universities. For example, many of Maryland's students are Asian. Not only language fluency, but also cultural expectations about teacher and student roles will differ across the current and future student body. Expectations for explicit assignments, how much to study for each module, styles of working and studying together, when to talk with one's professor—all are areas where diverse online students make assumptions and need clarification or greater tolerance for ambiguity. Designers and faculty should become more sensitive to this diversity and make careful, explicit decisions about how the virtual learning space is designed and used. On the other hand this diversity enriches the learning community and helps to foster cross-cultural understanding that is valuable in such an international field of work and research.
9. Students come from different disciplines, primarily from computer science or biological sciences. Careful provisions for review of or learning of basic concepts in several disciplines must be included in the design.
10. Universities have different schedules and academic program designs. Semesters vary in credits given for a typical course, in length, and in start/stop dates. The design must be adaptable so the modules may be edited down or learning objects extracted. Course modules and elements should also be designed so that they can be used in industry-based learning or adapted for public education.

Designing a Bioinformatics Course for the Web

The Maryland led course in introductory bioinformatics is roughly following a course development process that was developed for the Web Initiative in Teaching (WIT), a USM system-wide faculty leadership development program, led by Margaret Chambers. (Figure 1) This is a process that emphasizes inquiry, reflection and peer feedback. The UMBI VIRTUE faculty team are Fellows in the WIT program.

This will be an entirely new course not currently offered at any of the three universities, not a Web implementation of an existing course. Changes and revisions are frequent as the authoring scientists try to reconceptualize critical elements and tailor the course for novice undergraduates and beginning graduate students. Although an early commitment was made to problem based learning as the central pedagogical approach, many issues arise as we work on translating that approach into online course design. Decisions of content, modular structure, and framing the problems are reiterative. Several scenarios, which are being explored with a couple of biotechnology firms, are still under consideration. As soon as these scenarios are finally agreed upon, video clips from actual industry settings will be a part of the scenario presentations to highlight the focus on real-world challenges.

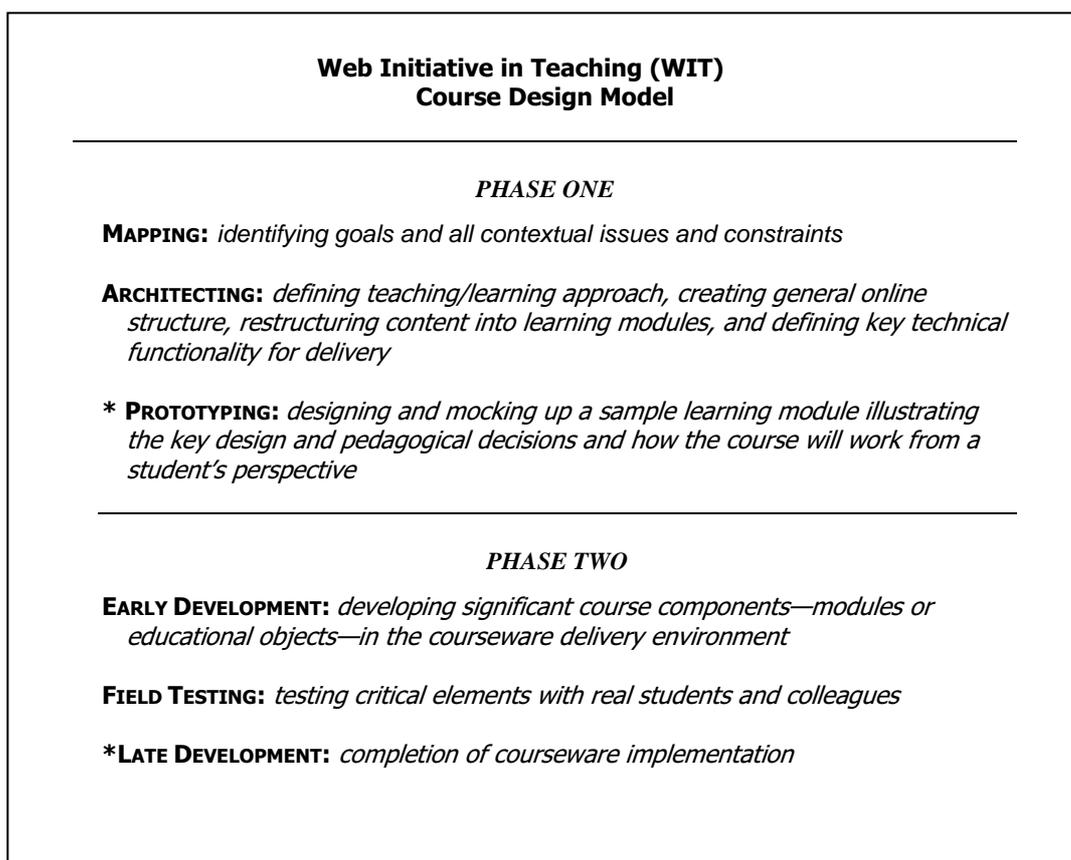


Figure 1: Web Initiative in Teaching (WIT) Course Design Model

The VIRTUE problem-based learning approach is still evolving. Professors and research scientists have differing ideas about what kinds of problems should be used and what kind of direct instruction or guidance instructors should provide. While these issues are being discussed, most of the development has focused on creating a resource rich environment. Learning objects are being defined using a variety of media. Maryland has a genome databank available on the Web that students will use to learn the process and tools for genome blasting. What is agreed upon however, is where the biggest challenges are. The heart of the traditional PBL experience has been the students' interaction, first around generating "learning issues" and secondly around evaluating the results from research. Both appear to be dependent upon expertise in facilitating online discourse. Currently the authoring faculty do not have these skills. Students too need skill in online group process and online decision-making. The course environment is being built in Blackboard. Few affordances are available now for the classroom to support such discourse or decision-making beyond computer conferencing. Being able to share objects or to visualize options can expedite collaboration. Modules also need to be tested against the learning styles of cultural diverse students, so appropriate support is created. (Rice, et al., 2001)

Searching for a Modular Design

How should we modularize an introductory bioinformatics course? How big or small should the problems be? What are the most appropriate kinds of support and scaffolding to help students? These are the issues that we are wrestling with.

Because the students are coming from two disciplines, computer or information science and biology science, we need to bring all of them up to speed first on basic concepts and skills from both disciplines. Rather than split the group and try to guess what they know or don't know, we are designing the first module as a concept learning task with mastery self testing. The idea is that students will explore a dynamic knowledge web of basic concepts from both disciplines and spend as much time or a little time as required to review or learn the concepts. We are using a software application that supports semantic networks on the Web. This software has evolved over twenty years of use in biological sciences at the University of California and California State University campuses. Most recently it was been the platform for extremely popular hypermedia courses in general education at San Diego State College. CollegeUnits, Inc., is now developing the tool further and refining the mastery learning test component. (www.collegeunits.com) Through a modified Delphi process we are gathering concepts from our authoring faculty and their colleagues. An analysis, assisted by functionality of the CollegeUnits software will show us which concepts are most embedded or related to other concepts. To build the knowledge map, each concept is linked to one or more concepts with a descriptive relationship. All relationships must be two ways. For example, "genome" is an "encoded blueprint" of "organism" and "organism" is "defined" by "genome." Each node in the knowledge web contains appropriate information, perhaps a definition with a picture or a complex description of an illustrated process or a set of defining attributes or exemplars. Some nodes will link to external resources; others are being authored for the course.

This module will promote student behaviours appropriate for problem-based learning in the later modules. It places the responsibility for learning on the student who must identify what he or she knows or does not know. It allows students to select and sequence their study and to work at their own pace. The resources in the knowledge webs may be revisited or reviewed as often as needed. While the student may ask questions of the tutor or other students in the online conference, the emphasis is on self-management. Mastery tests may be taken repeatedly. The test bank will produce a different version of the tests each time the student elects to take it. So testing can be diagnostic as well as mastery validation. Students take ownership for their mastery. They are neither forced to endure instruction of concepts already mastered nor rushed through new material where they need time to assimilate ideas.

The objective is to bring all students as quickly as possible to a base level of shared knowledge on which to proceed. A parallel or subsequent module will tutor students in the basics of Java scripting using more direct instruction and worked problem sets.

The subsequent modules are the heart of the course. As this paper is being written, these three modules are undergoing revision again, based on what has been learned from a distance education seminar this spring semester with VIRTUE graduate students over interactive video. As the focus shifts from content to be covered to providing a learning environment in which learning can take place, the less critical content is being pruned. Here Activity Theory (AT) is useful in conceptualizing the environment and use of tools. In activity theory the central relationship between an individual *participant/learner* and the *purpose* of the activity system is mediated by artifacts or *tools (physical or conceptual)*. (Peal, D., Wilson, B.G., 2001; Gifford, B.R., & Enyefy, N.D., 1999) In addition to creating a resource-rich problem-solving environment using multimedia modes for presenting information, we are trying to identify recurring conceptual tasks that may be facilitated by specialized software.

DNA for Scaling up in the Future

Today it feels as if we are working on the DNA of the tiny nematode worm, far from unravelling the "social organism" of an active international inquiry learning group. We have no grand schemes, only growing insights and competence. It will take several iterations teaching our first Web-based courses in aquaculture and bioinformatics before we can determine the blueprint for future Web-based courses. Our focus now is designing the framing problems that will help define the students' learning activities and

resources online. (Duit, R., & Treagust, D., 1998; Duch, B.J., 2001) In the initial teaching, we expect the faculty to deepen their insights into how problem-based approaches can spark and catalyze learning.

Our hypotheses about how students learn given these environments must be tested. Students are our natural partners in this. Over the summer we will be looking at how we might implement a theory-based evaluation of the first Web-based course in fall 2001. (Nash, et al., 2001) It has been used successfully at Uppsala University, Sweden, for a “reciprocal evaluation” of a bioinformatics class, in which students provided extensive data on the effectiveness of various elements of the course. (Anderson, et al., 2001) This process will help to make more explicit the implicit assumptions upon which many design decisions are currently based. This can be integrated with problem-based learning strategies for student reflection on their own learning.

Design is an iterative process in this dynamic medium. The power of Web-based learning to reach a global audience must not be squandered. We must diligently seek new, more effective learning strategies in Web-based and digital environments for diverse learners, means of engaging students’ minds with emerging scientific knowledge, and avenues to adapt for a variety of organizations and institutions. As faculty and developers of Web-based learning we must also pay attention to our own meta-learning— learning how to learn, collaborate and innovate across psychological as well as physical distance.

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REAL SHARED RESPONSIBILITY MOTIVATES REAL INTERACTION

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Introduction

Discussions on web-based interaction in learning contexts often revolve around the challenge many course designers experience trying to make dynamic and interesting discussions on the web in different conferencing systems. We discuss the role and importance of the moderator, what functionality we need the system to support and organisational issues among other things. The main focus of this paper however, will be on how the website itself, as the main common learning arena in a computer supported course, based on a pedagogical strategy that focus on students responsibility for their own learning, can contribute to a collaborative learning experience.

The empirical background for these reflections is our participation – as course designer/teacher and external evaluator - in a six months part-time (350 student hours) course module for teachers called Art, Culture and Context (ACC). We will give a short description of the course, discuss the concepts interaction and interactivity and give some examples from the course to illustrate our experiences and reflections.

1. The course

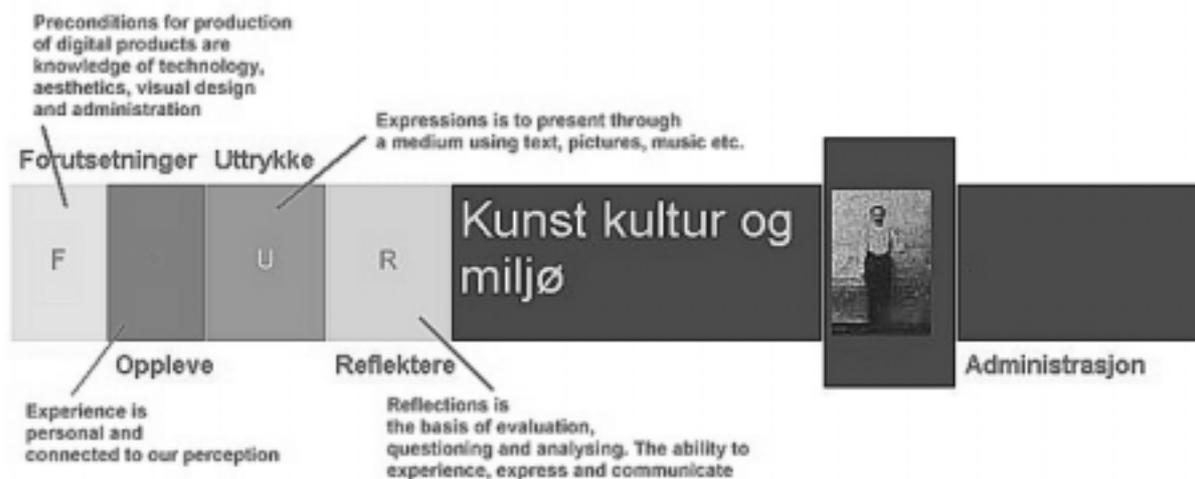
ACC is a 25% module of a continued education study called Drawing, Composition, Colour and Communication, which is aimed mainly at teachers in primary and secondary schools and also relevant for people working in various cultural institutions.

There were three physical meetings throughout the course, covering 35 hours work. The students were divided in study groups, which were in frequent contact between the meetings, by the conferencing system, group meetings, phone or e-mail. The teachers were also accessible by phone or e-mail. The students received a variety of input and assignments, all designed to support the main goal – to enable the students to create a functioning web site based on their own subject matter, designed and organised for educational purposes. They were introduced to theoretical reflections on art, society, web design and ICT based learning, they analysed web sites, wrote short essays and contributed in the conferencing system.

Most of the students had no previous knowledge of or experience with web design or ICT based learning, which created a need for technical support and guidance. This was sometimes provided by the teachers, and as the course moved on by their peers. The resulting web sites naturally showed great variation in complexity and sophistication, but they all managed to create something and are motivated to carry on. The tools used were Front Page, Paint Shop Pro and the conferencing system First Class.

In this course ICT was both a tool in the learning process, the means of communication and the subject matter. The experiences made by the participants using the course material on the web, and the reflections around these experiences, would be an important part of the learning outcome. As a consequence it was decided to use the course web site as a common learning arena in a particular way.

Like most such web sites it consisted of a rich pool of learning resources - tutorials, lectures, articles, texts, tasks, references, glossary, literature and links. In addition, and this is what we believe is new, the students were invited to contribute to the development of the course web site itself. It was therefore decided not to complete the web site before the course started in order to support this goal of student contribution. The following illustration, taken from the website, shows the global navigation toolbar with brief explanations which also directly represents the structure of the course.



After the first session, which focused on preconditions/assumptions, all the participants wrote about the course as a part of their evaluation and it's expression Christian – a student we will use as a “voice” in this paper - said;

Question....how to learn that there is more things you don't know about – to go from a feeling of being on the way to the top of the mountain of knowledge, to then become Icarus in free fall after three days, to confirm what all pupils (and some pedagogs) always have known, that learning is doing (often many times), to meet new and interesting teachers and fellow students often, and without becoming tired of their faces. Answer: join the new course at Oslo University College ACC.

2. The evaluation design - On interactivity and interaction – what's the ambition?

ACC may in many ways be considered a “meta course”. The students are expected to learn how to develop an interactive website by being part of a group using such a website created by others, and at the same time, as the main assignment in the course, building and improving their own site to use with their own students. In this arrangement we hoped to give their learning experiences immediate relevance, and create a direct connection between the content of the course and their daily work challenges.

In such a concept, evaluation also gets a double focus for the participants. They will evaluate the course design and the teachers: i) “Do they manage to make the interaction they want happen?” and ii) based on my experiences as a student in this course: “How can I make it happen with my own students? What will I adopt, and what will I definitely try to do differently?”

The ACC-web hopefully may serve as a model web, and the reflections in the evaluation process are part of the learning process itself. Evaluating other websites designed for learning or for displaying fine arts exhibitions was also a main part of the reflective aspect of the course.

The evaluation of the course will be quite comprehensive, as this is a new course with a different approach. The department for staff and learning development were invited to perform an “external” evaluation focussing on the learning environment and the interactive aspect of the course. True to the pedagogical model of the course these reflections were shared with the students during the course and published on the course website as part of the learning material. The questions raised in this evaluation concern i) the degree of interaction, ii) the participants influence on the course procedure and iii) whether this way of organising the course gave a deeper understanding of the course content. These are the issues we choose to focus on in this context, and we start by analysing what level of interaction was hoped for by the teachers and course designers.

The twin concepts interactivity and interaction are used frequently in the discussions and rhetoric related to web-based learning, e-learning and similar terms. *Interactivity* is often used in connection with the relationship between man and machine, or more precisely between man and computer program, while *interaction* happens along several dimensions in the learning process: student/teacher or guide, peer communication, student/learning material and content, and particularly relevant in continuing education,

between the student and her work environment and social life. *Social interaction* is unique in the learning process, and it's a big challenge to organise and support this interaction when it's mediated through the web.

Social interaction between students and teachers/guides may have different levels of ambition, and the reflections are often concerned with what we may call a discussion or communication level. We study the challenges involved in making the web conferences discussing subject matters become living arenas. This involves a limited part of the learning opportunities the web opens up, and ACC is based on a pedagogical model that implies higher ambitions for interaction. The students were expected to take part in the course development in ways we will describe. Many writers make a distinction between "Cooperation" and "Collaboration" where the first describes a "division of labour" where each participant is responsible for a defined part of a common product, while the latter points to assignments where the participants are mutually dependant upon each other to solve their part (Lehtinen 1999). An operational way of analysing the level of interaction with increasing degree of involvement and complexity may be the following – which often coincides with a gradual development of experience and ambition:

*Interaction student /learning material: The students can **access** course material through their web browser, and there is no element of social interaction.*

In ACC this consists of a rich and well integrated website with material designed for this course as well as links to other resources, including interactive multimedia programs for design and visual means. At Oslo University College we have made it a point that subject-oriented websites are developed and maintained by the teachers themselves with some editorial support in order to get the effect of the dynamic nature of the web technology in education. This was also the case in this course, and the fact that course developer and the teacher/tutor are the same person is a condition for making the website into more than an introduction of subject matters and other resources.

*Peer and student/teacher interaction on a **discussion** basis both on a face-to-face basis and mediated by the web is the next step.*

In ACC these discussions took place in the three physical meetings, on the telephone, via personal e-mail and in two conferences organised in First Class.

*Peer and student/teacher interaction based on **students publishing** their own material on the web, either as written reports or by using a wider range of hypermedia.*

Creating and publishing a website was one of the major goals of the course, and sharing their productions and their reflections are important aspects of the interaction. Peer feedback based on the same set of criteria that was developed for analysing professional websites was one of the course assignments.

*Peer and student/teacher interaction on a **production** basis: The web server is used as a **common collaborative platform**.*

There were no ambitions to allow the students editorial access to the course website, but the way the course website is used as a learning environment and as a common arena for content development still makes the collaborative perspective relevant in ACC. The students were both supposed to, and in fact did, influence the design and content of the website. We will show some examples of this. On the lowest level students asked for particular items of content. Students also evaluated the course website and gave feedback on the design, navigation and readability, as their own competence developed as a result of the course assignments.

3. Results, experiences and discussions

As this conference strand in EDEN is called "Searching for Best Practice" we have chosen to focus on sharing our success-stories where we feel we succeeded in creating a learning environment where the interactive capacities of the web gave added value to the learning processes. Some of our reflections are based on our own impressions, and some result from a small questionnaire distributed among the students

¹ Hypermedia. Boyle (1997) describes hypermedia as the combination of the associative character of hypertext with multimedia. We see the main features of hypermedia as: rich representations in content delivery, access to resources, communication and construction

as part of the course evaluation on the last gathering. One part of the questionnaire consisted of statements where they were asked to express degree of agreement on a scale from one to five.

3.1 A dynamic learning environment – student responsibility for their own learning process and outcome.

It is important to understand the conscious use of the “unfinished” learning material. It’s not uncommon to start a course without all the material produced. One of the advantages of the web as a platform for learning is in fact its dynamic character. In this case the dynamic effect was not an excuse for being able to add content as the course moved on. Indeed the idea of the unfinished and taking the dynamic character of the web and hypermedia seriously was fundamental for the whole course concept. This was based on a pedagogical model where, according to a social constructivist theory of learning, one of the key issues is to empower the students and put them in charge of their own learning processes and outcome – moving the focus from teaching to learning (Barr & Tagg 1995).

Most of the students felt they had this opportunity, and that their contributions mattered to a certain degree. The teachers point to this example:

As part of the first section of the course the students worked on an assignment on digital copyright issues. The assignment was based on work with a separate website about copyrights called *Opphavsrett* (Norwegian for copyright) (www.est.hio.no/opphavsrett). The students also conducted their own research, and Christian wanted to use some Swedish paintings on his website. He made a request for these paintings and, as he later wrote on his site, decided not to use them. His findings and assignment are now a part of the website *Opphavsrett*.

Christians findings: explained on his website: <http://home.online.no/~erlin-wa/tema.htm>

"....On this page I had planned to have two pictures of blackcocks painted by Liljefors. But because of the copyright and the fact that the paintings are less than 70 years old, it would have been too expensive. The price was ca 1600 NKr for two months on the web!!!!!!!!!! For this price you could go to Stockholm to see the paintings in real life in the National Museum. There you will find "Duvhøk och orrar" and "Orreleik på myra".

3.2 Responsibility for my own learning is like eating an elephant – in hypertext?

The joke that the best way, or only way, to eat an elephant is to take one bit at the time may serve as an illustration to one of the paradoxes of the web as a learning arena. The dynamic and flexible qualities of the web, used as in this course, invites and enables the students to take responsibility, not only for their own individual learning process but also for their share in the common course content. The same characteristics – the flexibility, richness and associative character of the web at the same time constitutes one of the greatest challenges trying to live up to these expectations. Being responsible for organising their own learning - within the framework set by cornerstones like assignments, physical meetings and designing their own websites - is quite a challenge for students that are used to being dragged and led through the school curriculum. The elephant being “virtual” and organised as hypermedia, does not help.

Again these challenges were made a part of the course. Experiencing them was an important part of the learning process for students whose aim is to create similar learning environments for their own students. In the spirit of ACC “survival” strategies were put on the agenda, and based on student’s and teacher’s reflections some tools were developed to support planning their way through the materials and assignments and for recording the progress and time spent. These tools were again made part of the course content and published on the website.

3.3 The Computer Conferencing System as an arena to support peer and teacher interaction

In our case the conferencing system was First Class, which is a fairly solid system, and the teachers were well acquainted with the system from previous courses. On the first meeting between teachers, students and “external” evaluator it became obvious that there were different expectations concerning what level of activity one could hope for in such a forum. What was evident even without examining the usage log was that the teachers were present and highly active in the conferences. We also found that some students

preferred to use the telephone, both to peer students and to the teachers. The teachers then lifted the questions and comments out into the common ground.

Art, culture and context embrace everything around us. The websites the participants were going to make throughout the course could be about anything they chose them to be. The importance and quality in the end product lay in how the topics were presented, what kind of experience and reflections that it led to. To train the ability to reflect and express themselves, the participants were challenged by the teachers to start reflecting on different themes from day one. The teachers provided four randomly picked topics that should be looked upon from different angles. The topics were a glove, a cube, a towel and a bridge. Here is a short quote from Christians reflections:

“...If the poet Haldis Moren Vesaas was right in that "every human is an island", it is not strange that we as social individuals are taken by the concept bridges. They make it easier to live psychologically and physically because they make it possible to get in contact with other humans.... But a bridge can also be a piece of art and have an esthetical dimension. Being a result of culture and context... the bridges led to communication: A society grew and a culture could develop...”

We have found that by organising a structured interaction between the students, in group meetings and on the web, teachers may reduce their part of the instruction and guidance. Still we have not achieved a student driven web conference. The teachers report that one of them attended the conferences on a daily basis, and the log from First Class shows that they have taken part in practically all dialogues. From personal experience as an online student we know the feeling of restlessness and decreasing motivation that come from the lack of response, and realise that good web-based discussions probably depend to a large extent on the teacher's attendance.

In ACC we did not find the reduction in the teachers' share of the time “allotted for speech” that is reported in other research. Harasim (1999) e.g. reports that while the teacher talks 80% of the time in the lecture hall, the students represent 85% of the contributions in the web-based conference. In our case the two teachers were responsible for at least 50% of the inputs and follow-ups.

But at the same time our experience support our idea that while the teacher's role is equally important, the content of that role will change, and indeed need to change, if the students are supposed to play a more active part. We might describe this role as the dual task of panning for gold and weaving. The person panning for gold is the one that by virtue of her knowledge and experience can spot the grains of gold between the pebbles and gravel. In our context this implies drawing the students attention to the inputs that throw light on important issues. The weaver is the one weaving the loose threads to a pattern by showing how the different inputs deal with the same sort of problem and also start new threads if needed to fulfil the pattern.

3.4 Other important arenas – telephone, private e-mail and group meetings

We have described the different arenas for interaction in the course: the physical meeting places, the web, the telephone. Both students and teachers confirm that the physical meetings were of great importance, and many students wanted even more frequent use of the physical meetings. One reason for this may be the operational character of the course where it's easier to receive guidance in the use of Front Page and Paint Shop Pro with the teacher or peer guide present by the computer. But there was general agreement that these meetings were an important success factor. We also find that the students tend to choose other technologies, such as the telephone and e-mail, which were introduced as options in the course. These are technologies that on the one hand are familiar and involve less publicity. Thus they represent less of a challenge for the students. On the other hand they tend to be tough on the teachers and fail to make the most of the collaborative functions available on the web.

4. Any conclusions? Or maybe just New Questions

We asked ourselves whether the students would feel they were able to influence on the course procedure and if this way of organising the course gave a deeper understanding of the course content.

Based on a small number of students and two enthusiastic teachers we have seen new possibilities for interaction and collaboration combining the dynamic character of the web with a pedagogical approach

that regards students as active learners. The idea of opening the course web to the students influence by keeping it unfinished proved a success and is worth exploring. What we might want to explore further is increasing the collaborative use of the web site even further, and create open areas on the web site where students and faculty share editorial rights and thus enhance the collaborative aspects.

It's obvious that there are still more questions than answers when it comes to the use of computer conferencing in an educational setting. Even if we have seen the beginnings of some interesting subject discussions on First Class, the students report that this was most important as a social arena. Professionals subscribe to discussion groups to keep updated. Distance learners are often adults with a number of competing responsibilities, where they tend to economise their attention and concentrate on activities that matter for the short-term outcome of the course. What we need to find out is criteria for putting together the most effective media mix, and move as much as possible of the subject discussions into the public room.

In Norway, as well as internationally, we are beginning to get results from research into the effect of ICT in school life and development. The importance of a pedagogical organisation of the learning process combining use of the web with a sociocultural approach to learning is well documented. Our experience with ACC seem to support the idea that combining the introduction of ICT with a pedagogical approach that emphasise student construction of knowledge in a social context give added effect to both initiatives (ref. e.g. <http://www.crito.uci.edu/tlc/html/findings.html>). In a course where ICT is subject matter, tool and learning arena this combination has proved very effective and we will continue to explore this even further.

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FLEXIBLE LEARNING AND MATHEMATICS EXAMINATION IN DISTANCE EDUCATION – VIEWS FROM A NEW PROGRAM

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A teacher says:

It is the examination that controls everything, and it is the examination that directs the unofficial syllabus. ... The examination is so important that it is meaningless to do anything in terms of new pedagogical methods if you don't do something about the examination at the same time.

The examination represents the entire pedagogy; it is the examination that decides what and how people learn. If I want students to learn more deeply—and I really do—then I have to change the examination; that's the only way that really works.

(Högskoleverket [National Agency for Higher Education], 1997, p. 21)

Introduction

It is important to realize the weight and importance the examination has when discussing possible changes to a course or a program. If the examination is not changed, then nothing is really changed in a course. The students rapidly interpret the important survival code in a course and adjust their learning and performance strategies according to it. We will discuss some experiences from a program in teacher education and point out situations, which become more visible when teaching and learning mathematics over the Internet. At the University of Gothenburg, we offer, among other programs, programs for elementary teachers who want to take an examination to become mathematics and natural science teachers for grades 1 to 7. We also offer a program for mathematics and natural science teachers for grades 4 to 9 to become teachers for the Gymnasium (grades 10 to 12) in mathematics and physics. Both are three-year programs (which are conducted at half the usual pace) and are given entirely by means of distance media, including e-mail, Web pages, video films, and “classroom discussion” through the computer conference system First Class. The first program started in fall 1997, and every fall since then a growing number of students have been accepted into the program. The program for mathematics and natural science teachers for grades 4 to 9 started in the fall of 2000.

To teach and learn mathematics over the Internet

In today's education an increasing emphasis is put on students' learning through problem-oriented or problem-based educational methods. The underlying idea is to improve the quality of students' learning about complex problems or phenomena in the world through assignments that give rich opportunities for active investigation, analysis, and reflection (Bowden & Marton, 1998; NCTM 2000). Such methods entail an increased use of a wide variety of different information sources. When studying mathematics, students also use tools like graphing and symbol-manipulating calculators and a variety of computer programs like MS-Excel, Graphmatica, and others. Students use assorted textbooks and other reference books, and many of them also use their family members, friends, colleagues, or maybe neighbors as a reference group.

One could argue that the way distance students study is closer to the way people ordinarily work than traditional in-class study. In many walks of life, people are valued for the everyday jobs or projects they do, their ability to work with others, their responses to problem situations, and their capacity to find tools or information that will help them to fulfill an assignment. In that kind of occupation as well as in distance studies, it is important to be open and flexible in one's learning. It is desirable and would be natural if the examinations in distance-education courses in mathematics could mirror that fact. Surprisingly, many distance education courses in mathematics, in Sweden as well as in other countries, seem to lose their flexibility when it comes to the issue of examinations. Students are encouraged to use graphic calculators and suitable computer packages when they are studying, but that way of working is

not taken advantage of in examinations. When it comes to an examination, the students must be identified and sit in a guarded and controlled room in a school close to where they live.

During their schooling, students inevitably try to identify, interpret, and follow authority (Lingefjård, 2000; Lingefjård & Kilpatrick 1998; Cobb, 1986). One interpretation of this social behavior is that the search for trustworthy authority is part of the human survival instinct. That instinct does not disappear when students begin their university studies, although the search for authorities or survival structures may be more hidden the older and more sophisticated they get. Nevertheless, there is always a didactical situation. In the case of distance education, there are naturally other sources of knowledge besides the student's personal knowledge that the student can rely upon.

In the complexity of a situation in which students are always away from the teacher when reflecting and learning mathematics at their own convenience, using calculators and computers from time to time, it is hard to describe all the relations that occur. The discussions in which the students take part nearly always have a third, silent partner: the calculator or computer software and its result. The third partner in the discussion changes the didactical contract between the students and the instructor at the same time that the situation of distance learning also changes the didactical situation.

Examination—Knowledge, Control, and Grading

Contrary to past views of learning, the cognitive psychology of today (Marton & Booth, 1997) suggests that learning is not linear but proceeds in many directions at once and at an uneven pace. People of all ages and ability levels constantly use and refine concepts. Furthermore, there is tremendous variety in the modes and speed with which people acquire knowledge, in the attention and memory capabilities they can apply to knowledge acquisition and performance, and in the ways in which they can demonstrate the personal meaning they have created. Current evidence about the nature of learning makes it apparent that instruction that strongly emphasizes structured drill and practice on discrete, factual knowledge does students a major disservice (Ramsden 1992, Marton & Booth, 1997). Acquisition of knowledge skills is not sufficient to make one into a competent thinker or problem solver. People also need to acquire the disposition to use their skills and strategies, as well as the knowledge of when and how to apply them. These are appropriate targets for assessment.

If one adds the component of existing technology, assessment becomes even more complicated. The support to be provided by technology when students are being assessed is a difficult issue and the subject of ongoing discussion in several places around the world. An essential consideration is whether students using, say, a computer program when they are learning should therefore be allowed to interact with that program when being assessed in mathematics. We have to find ways of assessing what is looked upon as important, rather than assessing what is easily measurable. In other words, we have to deal with the truism that, in mathematics education, what is assessed is what is valued, and what is valued is what is assessed (Arnold, Shiu & Ellerton, 1996).

If mathematics teachers allow group work, discussion, and information gathering in libraries and over the Internet, and also want students to learn more mathematics in collaborative work, then they face great demands on what types of problems they should pose. Silver and Kilpatrick (1989) argue for the use of open-ended problems in the assessment of mathematical problem solving, thereby moving from facts and procedures to concepts and structures. A relevant problem should encourage students to make various assumptions and use various strategies in which technology can serve as an aid but the technology part in the solving process should never be a goal in itself. The problems teachers choose also need to provide the students with opportunities to express what they have learned in the course and in previous courses. At the same time that the problem should remain nontrivial in the presence of technological tools, their use should not be the only performance component that is essential and leads to success (Lingefjård 2000; Lingefjård & Holmquist, 1999).

An essential part of the work inside the assessment process is how the teacher delivers student support. It is not always easy to handle the transition from conventional tuition to flexible and distance learning tuition. When feeding back to students some sense of the progress they are making in the course, a teacher is working in the field of informal assessment. Despite the fact that some of this is carried out by course material the teacher has the most important role in informal assessment. Nevertheless, our focus is more

on formal assessment carried out by teachers. This is a very important part of students feedback, it could be that such feedback is the most obvious teaching contact they have with their teacher during the coursework. Giving such feedback is a difficult task – the students will not understand, neither too kind nor too direct feedback in an assessment situation at a distance (Simpson, 2000).

In order to deal with the assessment questions in reality and to investigate potentials and obstacles in alternative assessment in mathematics education, we are at present running a research project funded by the Distance Education Authority (*Distansutbildningsmyndigheten* [DISTUM]) in Sweden. The study is strongly connected to the program for mathematics and natural science teachers for grades 4 to 9 to become teachers for the Gymnasium (grades 10 to 12) in mathematics and physics.

The first course in the program, a one-year course in mathematics at the University of Gothenburg known as MAL610, has a variety of objectives, all related to the main aims of learning and teaching mathematics and to the didactics of mathematics (for a definition of “aims” and “objectives,” see Rowntree, 1994, p. 50). The fact that the course plan is the first document to be accessed on the homepage for the course should, we hope, give the students an overview of the course (<http://ma-serv.did.gu.se/matematik/mal610/mal610.htm>).

- **Course Structure**

The course involves practice in mathematics by means of textbook problems, larger project-oriented assignments, and a final examination (Bowden & Marton, 1998, NCTM 2000). The course is based upon working by means of information and communication technology (Webb, 1992). Nearly all communication is done in that way: individual work, group discussions with other course participants, and discussions with advisors (Blomhøj, 1993).

- **Course Model**

To characterize the model used in this course, we use the classification of course models by Richard and Rohdin (1995). This course can be classified as being close to a third-generation course, with a dominating duplex communication that uses a number of facilities to enable maximal communication without interfering with independence over time and space (see media below). According to Bååth (1996), the course could be classified either as tutorial guidance, where the students control the learning but the teacher is available for guidance, or as a course with good structure and good opportunities for dialogues.

- **Course Media**

The course contains both face-to-face lectures at the start of the semester, virtual discussion groups (by way of First Class), e-mail contact, and a telephone evening once a month when the students are offered online guidance. Most of the course material (except the related literature) is available on the course’s homepage. On this homepage, students can have access to course document exercises and to assignments. This Web page also contains tutorials (via Power Point) on the use of graphing calculators and Graphmatica (freeware used in the course). The students are also encouraged to make sure that they have MS-Excel installed on their computer and to start using it. The Web page is in one sense the most important “location” of the whole course: Even though the course activities are spread out across different media, groups, and locations, the students can always come back to this page to find their way out of the task jungle.

- **Participants in the Course and in the Study**

In the fall of 2000, the program for natural science teachers for grades 4 to 9 to become teachers for the Gymnasium (grades 10 to 12) in mathematics and physics enrolled 23 students. They ranged in age from 26 to 49 years, with a median of 35.7 years and a mode of 32.5. Twelve were women, and most of them were experienced teachers. They all started the program with a one-year mathematics course that may be seen as consisting of four parts: calculus of one variable; discrete mathematics; integrals, curves, and series; and calculus of several variables.

- **Structure of Course Parts**

Based on the idea of constructing a variety of project problems for the course, we constructed different problems according to the different content areas above. We present one such problem and some reflections connected to this kind of assessment.

A Project Problem

Meta cognition

Meta cognition or what Piaget once called Reflective intelligence is something central for many teachers of mathematics as well as researchers in mathematics education. To expand ones own thinking on a mathematical problem from “just solving it” to actually understand how one solve it is of major importance for research on how students learn mathematics.

See for example *The psychology of Learning Mathematics* by Richard Skemp.

Solve the following problem and try at the same time to do a careful and throughout analysis of how you were thinking when you solved it.

Problem: Let $f(x)$ be an arbitrary cubic polynomial with the real roots a , b & c . Identify $(a+b)/2$ and draw a tangent to the curve in $((a+b)/2, f((a+b)/2))$. Is this tangent always passing through c ?

Try to solve the problem in at least two ways and carefully examine your own thinking during the process. With this in mind, suggest why and how this problem would fit into the teaching of mathematics in the Swedish gymnasium.

The mathematics teachers need to understand the interplay between the field of study we call mathematics and the activity of using the mathematics they study in the problem-solving process. If we see the two as equally important, it is logical to encourage students to make the best use of technology like graphing and symbol-manipulating calculators and computer programs. Hence, it is also important to try to find appropriate assessment tools and to try matching assessment to the teaching and learning process. As is clear from the above discussion, the need for appropriate assessment will be especially evident in a distance-learning situation.

Views from preliminary findings

The course activities are monitored by following the discussions in the virtual classroom in First Class, as well as by using the tool *History* in First Class. The History tool enables an observer to view which student who has been viewing and possible reading a message and if they have answered or not. Even if it is too early to draw any final conclusions, we do have the strong feeling that the students so far focus much more on the traditional final exam than on the written assignments, thereby revealing a possible strong opinion that it is the mathematics you can do by paper and pencil that is really important. Many of the participants seem to view the projects as something less important. A specifically more didactical task that were given to the participants, to compare ones own solution to a problem with a “model” solution, was even treated as not serious, not real mathematics. It is notable that the participants all are aiming at getting a teacher certificate for teaching at the Swedish gymnasium (grades 10-12), and that the mathematics courses at the gymnasium all stress the importance of communicating mathematics in a variety of ways: in writing mathematics, in oral presentations, and by traditional paper and pencil methods. Yet, the majority of the participants act as if they have been socialized back to the study situation they were in some 20 years ago, with a more traditional and limited view of mathematics.

The direct feedback is something that many students seem to see as a one-way agreement. Even though several of the students have failed to meet the deadline for assignments or exercises that they were accountable for, they at the same time have demanded direct feedback from the teachers. The mathematician who has the main responsibility for the mathematical content has managed to take active part in daily discussions, to present exercises and assignments as early as possible, to offer solutions to several problems from the textbook, and to schedule course meetings and exams well in advance; yet students sometimes express criticism because the virtual classroom was silent over a weekend or during holidays.

The appeal for direct feedback is evident in the course when a procedure has resulted in a correct answer or when there is an error in a long calculation. Even though the students are all teachers and some have long experience in teaching mathematics, most of them demand guidance when they become students themselves. Consequently, they are not so interested in examining and judging their own solutions to mathematical problem. It seems that even experienced teachers need a long time to take full responsibility

for their own studies and that the dominance of procedures over concepts when learning mathematics is hard to abandon.

An unexpected problem has been the difficulty of communicating mathematics in written form that many students demonstrate. While some students show expertise in writing mathematical formulas with their word processor's equation editor and in pasting formulas directly into First Class, others persistently communicate with inadequate handwritten reports by fax communication. This variety in expertise and in communication proficiency makes it very hard for teachers and students to agree on norms and expectations.

In accordance with the course structure that is in use, we can observe how the students have made use of the available information and communication technology. At present we are in the beginning of our analysis, and we are still gathering information about the experiences of students and teachers in the course. From the students, we will gather opinions about individual work, group discussions with other course participants, and discussions with the teachers in the course. From the teachers, we will find out how they viewed assessing all the different responses from the students, arranging examination situations including the choice of relevant problems, and delivering student support. From these perspectives, our intention is to describe and analyze the observed potentials and obstacles in flexible, alternative assessment in mathematics. The results will be published in a more detailed project report when the project is finished.

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SCREENWRITING FOR VIDEO IN EDUCATIONAL MULTIMEDIA (ALSO FOR SELF-STANDING VIDEO)

Jack Koumi

Three Usage Dimensions

A. TARGET AUDIENCE
1 Culture
2 Age
3 Commitment of viewers: eavesdroppers, students, students whose video learning is examined
4 Previous Experience / Knowledge
5 Facilities , eg. exclusive use of hardware that runs the package?

B. LEARNING CONTEXT AND COMPLEMENTARY LEARNING
1 Other media eg. class teacher, print, audio-tapes, other students, other computer packages
2 Pre-work, post-work
3 The surrounding package
4 Does the learner control how the package is run?

C. EDUCATIONAL OBJECTIVES of the video clip
1 Cognitive eg. knowledge, concepts, strategies
2 Experiential eg.: concretise, explore, demonstrate
3 Affective (motivations, feelings) e.g. generate determination, galvanise into action e.g. fascinate, amuse, change feelings/attitudes

PEDAGOGIC SCREENWRITING for each chapter of the content

1. HOOK	a Create suspense / appetise / fascinate (or entertain) b Shock / surprise / delight
2. SIGNPOST	a Set the scene / Introduce b Distant Signpost: what's coming later c Chapter Heading: what's next? d Focus: what to look out for e Context /Rationale: why we are doing it
3. FACILITATE ATTENTIVE, ACTIVE VIEWING (Encourage and enable sustained concentration)	a Pause words for contemplation b Encourage prediction c Don't mesmerise (don't <i>over-absorb</i> viewers, don't <i>submerge</i> their minds) d Pose questions
4. ENCOURAGE AND ENABLE CONSTRUCTIVE LEARNING (Cater in parallel for a range of viewers, enabling them to construct knowledge onto their cognitive framework)	a Words NOT DUPLICATING pictures b Concretise / Relate to current knowledge c Don't obscure the geography d Don't blinker, disclose the context (the conceptual geography) e Invent visual metaphors
5. SENSITISE (Facilitate receptive frame of mind)	a Seeding b Music Style/Occurrence by Design c Signal Change of Mood or Topic d Consistent style e Grammar of video (for viewing comfort) f Reassure / build confidence
6. ELUCIDATE	a Define Logical Status b Vary Tempo to indicate Syntax c Optimise, Load , Pace, Depth, Clarity d Enhance Legibility / Audibility
7. TEXTURE THE STORY	a Non-linear / Non-sequential b Vary Gravity using lighter items
8. REINFORCE	a Repetition b Re-exemplify c Compare / Contrast d Denouement / Dramatic Climax e Synergy between words and pictures
9. CONSOLIDATE / CONCLUDE	a Recapitulate b Consolidate / Summarise key features c Generalise / Extrapolate d Chapter Ending
10. LINK	a Content-Link between items b Story-Link / Pick-Up c Disclose assumed external knowledge
11. PROFESSIONAL INTEGRITY	a No false promises when hooking b Unbiased exposition c Don't propagandise d Avoid artificial links e Design for students, not colleagues f Don't <i>invent</i> objectives to justify video

This note applies to video in multimedia (not to self-standing video)

The pedagogic screenwriting principles (above right) are intended to apply to each multimedia section or *chapter* that includes a video clip:-

definition: multimedia chapter that includes a video clip = video clip *together with* related text and graphics that make up a self-contained section

So the principles above are not meant to apply just to the video clip by itself, but rather to the whole section (or chapter) containing the video clip

But, there are two deviations from this idea, at opposite poles. First, when the video clip by itself forms the *chapter*. Second, when the multimedia chapter *disintegrates* because the learner has chosen to study its elements in the “wrong” order. Here are the implications of these two deviations

1. If the video clip itself is self-standing as a *chapter*, the structuring principles also apply to the clip on its own. (Such a self-standing video clip would be quite long, eg over 3 minutes). This is also the case for broadcast tv programmes or videos that are self-standing (i.e. not contained within a multimedia package).
2. Suppose that a sequence of elements of the package comes with a recommended order of study – for example, the sequence might consist of some text, then a video clip then some graphics, then some concluding text. The author’s intention is that the sequence, studied in that order, forms a self-standing chapter of content.

However, also suppose that the package allows the learner **total freedom of random access**.

Then an adventurous learner might choose to experience the elements of the chapter in the *wrong* order. Hence, the integrity of the sequence would disappear and there would no longer be a *chapter*.

Nevertheless, the above structuring principles would help those learners who do follow the recommended order. Those more adventurous learners who stray from the recommended order might be the types of people who don’t need as much structuring as the others.

LINC: MULTIMEDIA, INTERACTION AND INTEGRATION

Kris Van de Poel, Universiteit Antwerpen, Centrum voor taal en spraak-Centre for Language and Speech

LINC (An Interactive Approach to Language and Culture)¹ and its sister programmes LOKI (East-West Integration through Language and Culture) and LAO (Bridging Academic Gaps) are interactive multimedia packages which combine language acquisition with the acquisition of socio-cultural knowledge on the basis of topics from current affairs programmes. LINC trains the four language skills, i.e. reading, listening, speaking and writing, as well as applied academic skills such as outlining, summarising, criticising, discussing, etc. in 24 languages.

Visual materials, selected from current affairs programmes, are the basis for linguistic *exercises* on two levels: an intermediate level and an advanced level (cf. terminology and requirements used for international language exams). The exercise materials are based on new didactic insights in foreign language teaching and a gradual and cyclic *syllabus* which is a reflection of a wide experience of the problems that learners from different language backgrounds may have. Vocabulary and grammar are learned functionally and this is based on the underlying principle that it is not just important that the building blocks of the language (declarative knowledge) are mastered but that also the ability² to communicate about the daily realities of a native speaker (procedural knowledge) is acquired (Færch & Kasper, 1983). In other words, the program is both knowledge- and skills-oriented. Thus, *LINC* extends itself outside the scope of the visual materials it is based on by reading materials, WWW-links and computer conferencing facilities. The Central and Eastern European languages are also phonetically supported and tests (achievement and proficiency tests) are available for 5 of the EU languages on a special website.

Target Group and Learning Routes

The program is intended for adult learners, starting from the age of 16 and upwards. In view of the material provided, i.e. current affairs, *LINC* has been shown to work best with learners who have an academic background and are familiar with analytical learning approaches.

Lexical and grammatical exercises, interactive tasks, authentic and semi-authentic materials and hyperlinks all contribute to *LINC's multimedia teaching and learning*. Its main characteristic is that learning a language should be a *meaningful* activity in which the individual's *learning preferences and styles* are taken into account as much as possible. Since the package is designed for learners with a pedagogical/didactical past, i.e. they have formally learned at least one foreign language before, we do not want to keep them away from possible useful *information* e.g. of a lexical or grammatical nature. *Analytical thinking* has been acquired by this target group, therefore, it has to be tickled in the approach too.

Since the materials are provided on CD-ROM with computer conferencing facilities, *autonomous* learning and distance learning seem to be the obvious learning routes. However, *LINC* can also be integrated in contact teaching modules possibly in combination with autonomous learning in the case of e.g. grammatical items, or when offered in resource or self-access centres feed-back can be provided by the pedagogical staff responsible for guiding adequate learning output (Van de Poel, 1996 & 1998).

Since autonomous learning and language learning are not always the best of partners, *LINC* deliberately aims at efficiency and effectivity by means of providing learners with all the necessary tools for optimal learning. Therefore, users get access to video materials and exercises as well as learning menus, learning

¹ The development of LinC and LOKI has been made possible by the support of SOCRATES, LINGUA ACTION D. In the following I will only refer to LinC, thus including LOKI, unless otherwise stated. LAO has been partially funded by the Flemish Government, Department of Education.

² Acquiring the ability also implies the knowledge of how the language works. Thus, procedural knowledge at the same time has to be interpreted as the cognitive component, i.e. know how the language system works as well as the applied component, i.e. know how to apply the rules in order to reach appropriate and adequate communication.

tips, transparent instructions, a correction key with feedback, reading materials and a WorldWideWeb-information page on CD-ROM. Furthermore, there is access to a reference grammar and vocabulary list as well as cultural information.

In order to maximise motivation learners are encouraged to communicate and discuss with members of the target culture, thus adhering to the principle that: *languages are typically learned in the process of becoming a member of a particular group, and the sustaining motivation appears to be one of group membership, not of language acquisition per se* (Gardner & Lambert. 1969). *Technological aids* (interactive CD-ROM, www-links and computer conferencing through FirstClass) make it possible to get in touch with the different target cultures of the various European countries both directly and indirectly. The topics and tasks on the CD-ROM are designed to stimulate questioning, discussing, problem solving and critical thinking. The computer software enables the learners to get into contact with one another and/or a native speaker monitor. During these computer conferencing sessions, learners get comprehensive feedback about their learning process.

Research has shown that this interactive package does not only improve 'virtual' socio-cultural learning, but also enhances and facilitates real and virtual exchanges and supports the objective of life-long learning with its inherent features of self-access and learner autonomy, bringing the classroom and the learning process closer to 'real' life.

Language Input

The *language* in which the materials, tips and instructions are presented is adult. Learning a language for socio-cultural exchange is not regarded as a children's game or an MTV clip (however much fun they can be), nor do we provide testing as a steering mechanism for this learning tool. *LINC* does not avoid metalingual references. Grammatical topics are referred to in academic terms, etc.

The input language is *L+1*, one level above the presently acquired level (cf. Krashen's input hypothesis, 1982 and 1989). In order to be meaningful, the data presented have to have content too. Grammar for grammar's sake is rarely regarded as entertaining and stimulating for learning (although there are of course exceptions to this rule). Therefore, we look for an added value as far as content is concerned by embedding the language learning in its *socio-cultural context*.

The LINC-Model in a Nutshell

The learners have three main activities at their disposal. These activities roughly correspond to the different learning phases which will be explained next.

1. WATCHING and listening to a video extract, with the possibility to look at the transcript and footnotes which explain socio-cultural concepts in the form of hyperlinks.
2. TRAINING or practice goes from listening over writing to reading and chatting. As far as linguistic content is concerned the language presented and practised moves from word to sentence to text both at the level of vocabulary and grammar. The learners are helped and supported in this process by different forms of reference materials: word lists containing all the new words to be learned with morphological information and transparent carrier phrases and a reference grammar based on words already known to the target group.
3. PROCESSING is task-based and leads to problem-solving activities. This phase also contains the materials for further reading, access to www-links which provide the ultimate entrance to interactivity and a computer conferencing section with which learners can get in 'verbal' contact with their native speaker monitor and peers for further reference and/or discussion. Since chat links approximate the oral skills to the closest, the last of the four skills is reached through this medium.

The LINC-Methodology or Learning Phases

Four phases gradually take the learner through the learning process. The phases follow as an overall rule that the presentation of the materials as well as the learning moves from discrete items (i.e. items in pedagogical isolation in order to totally focus the attention on the item and aspect to be learned, e.g. morphological structure, syntactic oddity, etc.) to integrated items (i.e. items in authentic or genuine

linguistic contexts). This entails that in the course of the learning process the items are presented from as early on as possible in meaningful units, i.e. sentences, paragraphs, texts.

In the **introductory phase** learners are confronted with the materials for the first time. The materials are authentic in nature, but since they have to form a meaningful part of the learning process they are reworked into pedagogically digestible units³ at the same time still being contextualised.

In the **input phase** the information is selected and organised in workable units. We have chosen to focus specifically on active listening (and reading), although some of the strategies presented here will continue throughout the acquisition phase. Skills approached here range from global to focused listening and aim at providing learners with an insight into listening strategies. Learners can constantly refer back to video, audio and transcription with socio-cultural hyperlinks.

The **contextual phase** focuses on the building blocks of the language, i.e. vocabulary and structures. The authentic texts are reworked into teaching/learning texts: they are *problem-based* and aim at *integrating* the different skills, from receptive to *productive*.

In the **application or processing phase**, words or structures which were first learnt are brought together and revised in larger contexts (reading as well as writing) so that the acquired knowledge and skills can be applied to comparable, related and finally different contexts (provided in free writing and reading tasks and working with www-links). Within the construction of a 'lesson' the processing phase is regarded as the final goal, the main objective. All other tasks, i.e. the introduction to and comprehension of the video extract, the acquisition and use of the building blocks, i.e. vocabulary and grammatical structures, prepare the learner for processing exercises in reading and writing which require the application of everything which has been learnt and allow the learner to reflect on and articulate his/her opinion. Moreover, they prepare the learner to get in touch with the native speaker monitor and peers during computer conferencing sessions by FirstClass.

It should be pointed out that the different phases can overlap, and they can certainly occur in a more creative sequence than presented here. If the learner adheres to the developed order s/he will be guided through a **gradual** syllabus, but as indicated in the *LINC*-introduction this order is not imperative and learners can freely move around.

In order to assure optimal learning, and as much as possible safeguard learners for fossilisation, the syllabus has a strict **cyclic** approach, i.e. potential linguistic and learning problems are presented and repeated in different contexts and elaborated further. The designers therefore do not only restrict themselves to existing taxonomies of the language under consideration (like e.g. used for determining levels in international exams and the Council of Europe's threshold level), they also rely on their own teaching experience and in some cases on a needs analysis in order to ensure the selection of the most efficient learning strategy.

Quality Control of the Production Phase

LINC was originally developed for 13 European Union languages and has been extended within LOKI to four Central and Eastern European languages (i.e. one language per CD-ROM). Every language package is designed by at least one native speaker assisted by a group of pedagogical and technological testers. Thus, 45 people in all are actively involved in the project. These 45 developers and testers (from 14 countries) are in close and continuous contact, with the result that the designers have been thoroughly introduced to the method for syllabus and material design, which in turn has resulted in a syllabus for the foreign language concerned at all levels.

Four *partners* in the project fulfil the role of co-ordinator in their own specialised domains. The management network structure looks as follows:

³ This is a move from 'authentic' to 'genuine' materials (see Van de Poel, 1999 in press).

1. The *University of Antwerp - Centre for Language and Speech* (Belgium) is responsible for the syllabus design and co-ordinates the pedagogical development of the exercises and other materials,
2. The *Aarhus School of Business* (Denmark) co-ordinates the alpha- and beta-test phase (i.e. pedagogical and technological testing),
3. *Correwyn Consulting* (Belgium) co-ordinates the technological production,
4. *EOUN* (European Open University Network operating from Heerlen - the Netherlands) is responsible for the pedagogical-technological adjustments and the training of the monitor team.

Thanks to an elaborate *communication network* (personal contact and computer conferencing) possible problems were anticipated at an early stage and the motivation of the participants and partners was optimised. Two pedagogical staff have monitored the development of the materials by means of a progress report, which ensured quality as well as efficient time management.

LINC's pedagogical model is based on a four year trial with ODL in the form of a mixed media model for Dutch as a Foreign language called *Mediaproject*. From 1994 to 1998 50,000 learners from all over the world have learned and updated their knowledge of Dutch and its culture by this approach.

The pedagogical and technological components are constantly *monitored* by a designer and pedagogical co-ordinators by means of computer conferencing and progress reports in order to ensure its optimal integration of new technologies in the syllabus. European values are taken into account and special attention is paid to less easily accessible topics like devolution in different European countries.

The materials have been presented at different *meetings, workshops* and in *publications* and have been extensively evaluated by a wide range of potential end users. An alpha- and beta-test phase have ensured that content as well as technical flaws have been amended. The different computer experts have spent quite some energy in platform compatibility. Therefore, we can guarantee that the system works for MAC and PC platforms.

Taking *LinC* a step further

LINC, as an interactive multimedia package, aims at learning languages in meaningful socio-cultural contexts. As such it is a medium between the 'new' learner who is largely responsible for his/her own learning content and the 'new' teacher who operates on different levels as a guide, lecturer, monitor, etc. Therefore, *LINC* provides several learning routes (menus, tips, communicative and skills-approach) and learning modes (autonomous, semi-autonomous, contact learning, etc.), thus hoping to bring the best from the CIT-world into the pedagogical and human communicative world.

In searching for the best practice in how to integrate multiple forms of learning in the workplace we developed *BlinC*, a learning package for small and medium-sized enterprises trading software with French-speaking clients (in html on CD-ROM).

Pedagogical insights as well as the changing needs and demands of the endusers have led to initially developing with authoring programs, later on enriched with Internet-access, to html-based packages first on CD-ROM and later on on the Internet.

A MULTIMEDIA STORYBOARD AS AN OBJECT AND AS A STARTING POINT FOR LANGUAGE LEARNING

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1. Introduction

Fables have been known for centuries to be an excellent means for the expression of thoughts and ideas as well as for teaching human values. This paper deals with the possibilities that a multimedia storyboard offers in supporting the teaching/learning process of a subject area. In particular, an attempt is made to interpret the added value emerging from the employment of a multimedia storyboard in a Computer Assisted Language Learning (CALL) environment.

The employment of a storyboard in the learning process lies in the fact that the appeal of fables has always been unquestionable to all ages and, in particular, to young children. The plot of a fable can be considered as the Ariadne's clue, which guides the user to a journey of discovering knowledge. A storyboard can incorporate all the necessary constituents that allow its use as a means for language learning especially to young children. According to Porcher (1991) "childhood constitutes the triumph of narration [...]. Language learning could not therefore ignore this dimension, even if it wished to do so". In addition, a storyboard as a means for supporting the teaching/learning process of a subject area complies with all ages interests and preferences.

The realisation of a storyboard in a computer environment, with the use of new technologies, makes it more attractive and engaging for the learners. Recent research results prove the effectiveness of the new technologies in the learning process. In particular, new technologies improve learners' performance, and reduce the time of learning (Kulik *et al.* 1980 and Kulik 1994). Furthermore, by using new technologies young children can enhance their reading and writing skills (Poole, 1997).

The multimedia storyboard can exploit the potentials of the new technologies. Visual and acoustic memory of the pupils are simultaneously activated in order to trigger the learning process. Modern user interfaces enable young learners to take advantage of the multimedia content. Especially, new developments in multimedia and animation technologies allow the realisation of a fable in a way that creates a sense of immersion for the user. The development of a user-friendly environment enables the learner to be actively engaged in the learning process. Learners need to become involved and motivated by the materials and to take ownership of the skills and knowledge that they acquire. It is worth noting that the use of a CALL environment can help pupils to build a positive attitude towards the language course.

The dual role of a multimedia storyboard as an object and as a starting point for learning offers many possibilities for pedagogical/teaching realisations and can be exploited for every subject area as can be seen in Figure 1. In the first approach the story itself contains a sufficient number of reference points as well as user activities (e.g. educational games, logical puzzles, etc.) related to the subject area. The teaching material consists of the reference points that are fully embodied in the plot of the story. The user activities are used for the presentation of the teaching material in an exploratory and interactive way and for practising purposes. This approach allows the integration of cross-thematic elements within the storyline enabling this way the interdisciplinary learning.

In the second approach, the reference points of the storyboard are used as points of departure that are further expanded in a parallel level for teaching purposes. The reference points correspond to the phenomena to be taught. The teaching material, in this case, involves a systematic presentation of the phenomena followed by a number of exercises that enable the user to test and consolidate the knowledge s/he has received during the systematic presentation. In this approach the learning process is loosely connected to the story, and therefore the interdisciplinary element is not supported.

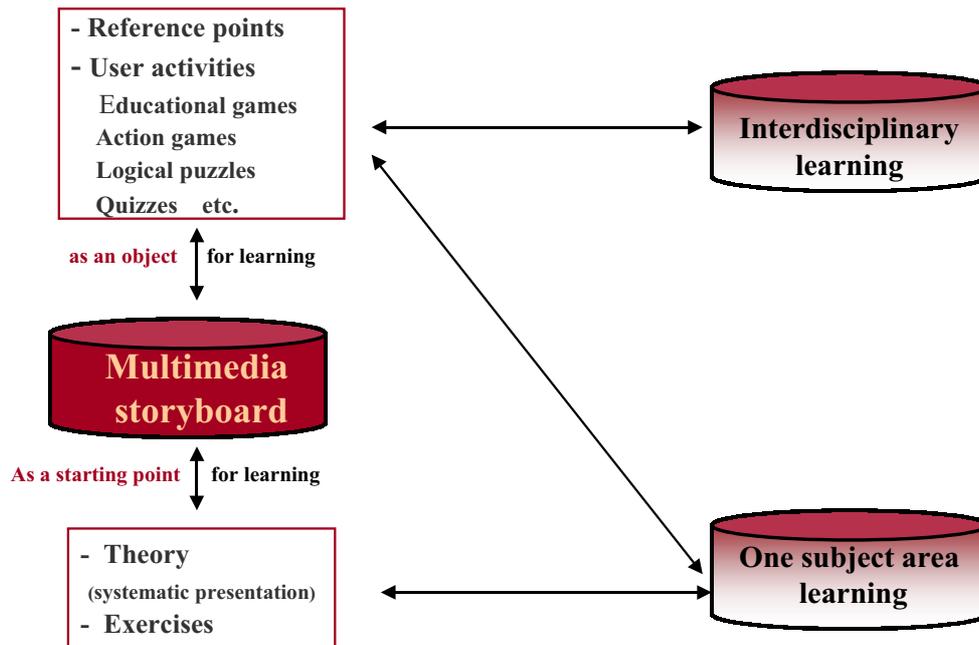


Figure 1: Teaching models of a multimedia storyboard

In Sections 2 and 3, we will examine how the dual role of a multimedia storyboard as an object and as a starting point for language teaching/learning purposes can be realised. Section 4 presents the MYTHE project as a case study of a CALL environment that is based on a multimedia storyboard. Finally, a summary of the paper is presented in Section 5.

2. The multimedia storyboard as an object for language learning

Recent research suggests that is essential for the developing mind to acquire personal experiences through different combinations of action and practice in order to develop the requisite abilities. The storyboard can represent the framework in which the knowledge can be considerably shaped through personal experience and users will be receptive to getting and elaborating stimuli that promote their ability of learning. Knowledge can be obtained either implicitly or explicitly through the plot of the multimedia storyboard by means of references or user activities related to the teaching material.

The plot can incorporate points of reference and user activities relating to one or several thematic areas or disciplines as shown in Figure 2. Through the dialogues of the story the user will have the chance to be exposed to all aspects of language (phonology, morphology, vocabulary, semantics, pragmatics). In addition, through the user activities the user interacts with the environment and may acquire knowledge in an exploratory way. In this way, the needs of playing and expression (through language, motion, music, painting, etc.) can be embraced. In particular, the storyboard can be enriched with the following types of user activities:

- Action/educational games

Action and educational games are activities that are realised in a game-like way. The purpose of this kind of games is twofold: a) playing and b) offer the user the possibility to acquire skills. For example, a situation where the user has to avoid flying objects can make the learning environment more entertaining. In this case the user has the chance to play and, at the same time, to become familiar with the use of the mouse and/or keyboard. On the other hand, an educational game can expose the learner to situations taken from real life. For example, a simulation of car driving in roads with signs enables the user to come across with situations where s/he is forced to follow certain behavioural patterns. The possibility to combine learning with entertainment is very important especially for young children.

- Logical puzzles

These are activities that expose the user to situations that develop her/his logical and cognitive skills. The idea is to give the user the chance to solve a problem by helping the heroes of the story to accomplish a specific task each time. For example, the user has to use a magnet to take a key out of a crack of the floor. In the case of a language learning environment the user practises her/his listening and reading comprehension skills and at the same time s/he has to use her/his analytical ability to solve the logical puzzle.

- Quizzes

These are activities that aim at the acquisition of language skills and/or knowledge and skills relating to other thematic areas or disciplines. Quizzes are fully incorporated in the plot of the story. For example, the user has to help the heroes to read a “secret” message by putting the words in the right order or find the missing letters. Quizzes can also be presented explicitly through multiple-choice questions. The knowledge can lie either in the question or in the answers. For example, the user must answer a number of questions in order to help the heroes of the story. The story will not proceed unless the correct answer is given.

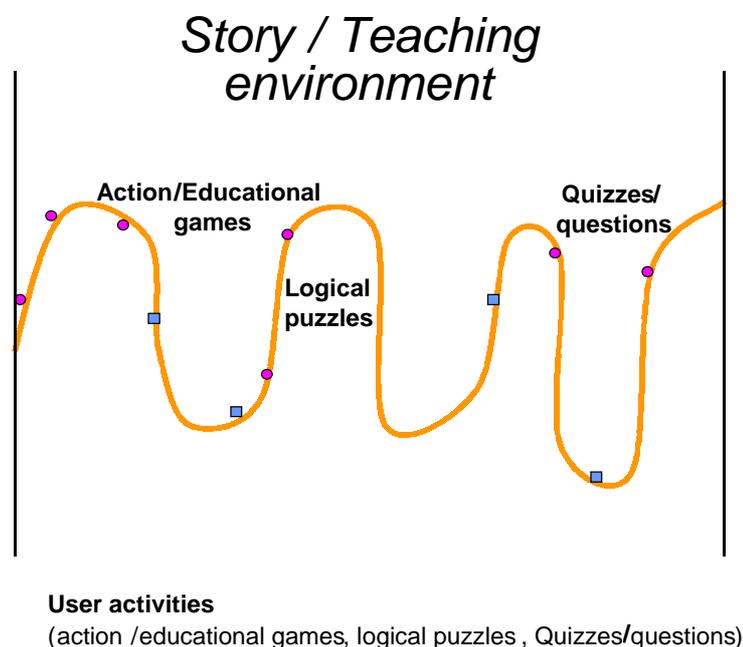


Figure 2: Teaching model of a multimedia storyboard as an object for language teaching

It is evident that with the use of new technologies a multimedia storyboard contains the necessary resources (text, audio and video) which can support the teaching material. In this way the storyboard is more attractive and enables the user to discover the knowledge her/himself and to build it up at her/his own pace.

The suggested teaching model uses the multimedia storyboard as a “vehicle” to carry knowledge and skills based on the pedagogical and teaching objectives which include also “hidden” pedagogical features promoting in this way the following:

- interdisciplinary learning

Through the multimedia storyboard, the user may acquire knowledge that can be used in specific scientific domains. The interdisciplinary learning can be promoted via reference points included in the plot or via encyclopaedic questions related to several thematic areas, e.g. zoology, botany, etc.

- cross-cultural education

The multimedia storyboard may incorporate a considerable number of cross-cultural elements that can be naturally introduced within the plot (for example, characters of different nationalities, objects such as flags, traditional food and monuments from different countries, etc.). The promotion of cross-cultural education contributes to the consolidation of the user's identity, to the understanding of other cultures and civilisations, and to the development of a positive attitude towards them.

- awareness of human values

The plot of the storyboard may contribute also to the awareness of certain notions, as well as to the development of positive social attitudes and perceptions. The multimedia storyboard could be interspersed with pan-human elements cultivating in this way positive behavioural patterns.

The main difference between the teaching model that is based on various extracts from literature, newspapers etc. and the one that is based on an event driven story lies on the coherence of the latter. A storyboard can also be seen as a sequence of situations/cases relevant to the subject area under consideration. However, the use of existing stories for that purpose can only meet part of the teaching objectives. It is therefore proposed first to set the teaching objectives and then build the story around these objectives.

3. The multimedia storyboard as a starting point for language teaching /learning

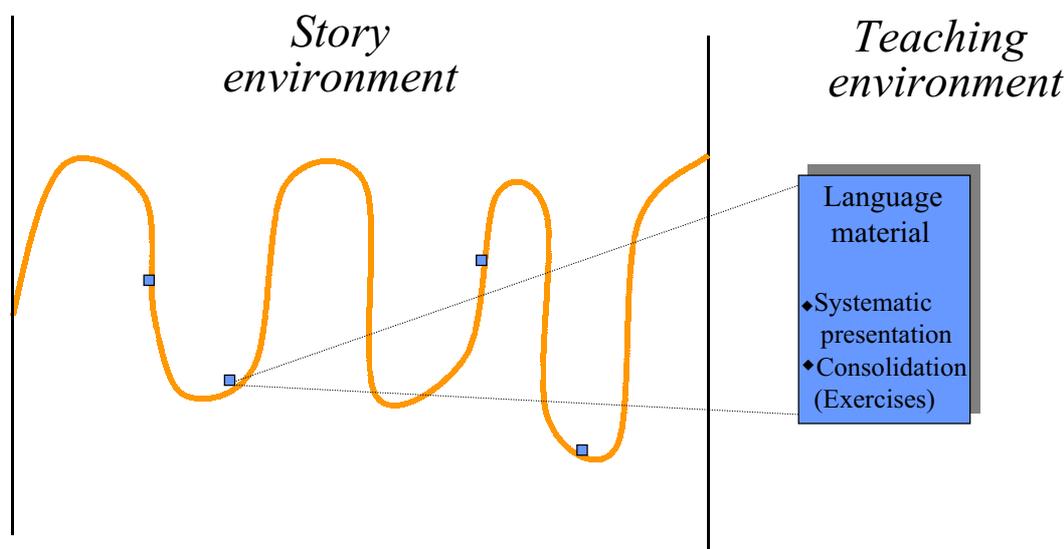
As mentioned above the storyboard itself contains many constituents around which the language teaching material can be built. Furthermore, a multimedia storyboard can be used as a starting point for a more systematic language teaching /learning. In this approach, the story is realised in the *story environment* while the teaching of the language material takes place in another environment, the *teaching environment*, as can be seen in Figure 3. These two environments are connected through the points of reference that are contained in the story and are expanded further in the teaching environment. The teaching material consists of the a) Systematic presentation and b) Consolidation (exercises and evaluation).

a) *Systematic presentation*

The systematic presentation of a subject is realised by means of small dialogues, which present in detail the linguistic functions, language phenomena and vocabulary existing in the plot. Parts of the dialogues of the story will be employed and further expanded at the teaching level, for a systematic presentation of particular phenomena and functions. The objective of this presentation may divert from the plot of the story and can be seen as a stand-alone situation.

b) *Consolidation*

The consolidation of the knowledge is realised through practising of the language phenomena and/or functions. Language exercises allow the user to test and consolidate the linguistic input s/he has received by watching/learning the story and the systematic presentation of the corresponding language phenomenon and/or function. Evaluation is the process of feedback by which the user becomes aware of the degree of success of her/his training. Overall evaluation strategies should include the formative and summative evaluation that will take place during the development phase. The parallel level of the teaching environment is related to the teaching material and allows the user to choose a language phenomenon and/or function, navigate through the systematic presentation of the phenomenon, which is related to a point of reference in the storyboard, and finally practise through language exercises.



- Reference point to a language phenomenon or function

Figure 3: Teaching model of a multimedia storyboard as a starting point for language teaching

The advantages of such a teaching model is that the systematic presentation of the language material as well as the practising of the language are realised on a different level that leaves untouched the plot of the story. So the storyboard remains authentic and the teaching material is presented in detail.

4. MYTHE – A case study of a multimedia storyboard

MYTHE project (mythe.ilsp.gr), an EC funded project, aims at setting three languages (Dutch, English, and Greek) within a common CALL environment to be used by young children aged 6-8, for both mother tongue and second language learning. The language material of the platform is build around a story that is presented in an interactive 3D environment with animated characters. The pedagogical/teaching model adopted is similar to the one shown in Figure 3. The teaching goals are realised in two levels: a) the story level and b) the pure teaching level.

a) Story level

The storyboard is developed on the basis of five thematic areas, namely: environment, health/hygiene, culture/arts, science and technology and democracy. So the plot of the fable is interspersed with pan-human elements in order to develop positive social attitudes. The story of MYTHE is interspersed with user activities that include *encyclopaedic questions*, *action games* and *logical puzzles*.

b) Teaching level

This level includes the presentation of the language phenomena and functions followed by a number of language exercises. The transition from the story level to this level takes place at the end of each episode and involves the transition from the environment of the action to the environment of language teaching and practising.

Every language phenomenon and/or function is presented in two stages: a) the presentation of the language phenomenon and b) the language exercises. The presentation involves small dialogues, which present in detail the linguistic functions, vocabulary and language phenomena existing in each episode. Parts of the dialogues of the story are employed and further expanded at the teaching level for the systematic presentation of a particular language phenomenon and/or function. The exercises component is the part where the user tests and consolidates the linguistic input s/he has received in the course of the episode and the presentation part.

A number of Language and Imaging (LIM) tools has also been incorporated to facilitate the learning process. These include spelling and agreement checkers, continuous speech recognition, correct stress position assessment tool, and lip motion tool. The tools are used in the environment of the exercises or in the user activities of the story. In particular, the lip motion tool is used in the dictionary setting that

enables the user to watch the pronunciation of the words from different angles. More details can be found in Katsouros (2000).

5. Summary

In this article two teaching models of a computer assisted learning environment based on a storyboard were presented. Language was selected as the subject area but the suggested model is valid for any other subject area. In the first model, the storyboard itself contains all the necessary learning material which is presented within the storyboard through points of reference to the theory or through user activities such as logical puzzles, quizzes and action and educational games. The second teaching model consists of two levels: a) the storyboard and b) the teaching level. In this approach the storyboard contains reference points of the subject area, which are expanded further on a parallel level, the teaching level, for a more systematic presentation of the theory. The teaching level also includes a number of exercises that help the consolidation of the knowledge by the user. Finally, the MYTHE project is presented as an example of a CALL environment that combines the two teaching models.

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"FRENCH FOR YOU" - A NEW PRACTICE

Marianne Öberg, Komvux Örebro

Introduction

When I started working within adult education eight years ago, I found that it was not easy to get students interested in learning French. Adult students in general didn't seem to think that they could learn a second foreign language. One common reason for this was that they thought that they were too old. Another reason was that knowing one foreign language, English, was considered "enough"

Since then, knowing a second foreign language has become more and more important for different reasons. The European Union, the demand and need for communication and cultural understanding, they all stress the importance of language learning.

I teach French and English, and in this paper I will tell you about how we in Komvux, Örebro have developed the teaching and learning of French in adult education. I will start by giving a brief account of what the situation was like and what problems were in focus before the new plan was introduced.

Background

In the mid 90s, in Örebro, there were not many adult students who wanted to learn French. When asked why, they either said that they were too old or that languages didn't interest them. Being a teacher of French I started persuading students by saying that I thought they should try, that French is an important language in Europe etc. The number of students who started studying French increased, but they usually left after one term, because they thought that French was too "difficult" and that studying French demanded a lot of time. There was a lot of homework to do. Yet another reason for not continuing was that foreign languages were not valued highly when it came to applying for further education. A second foreign language was not necessary in order to be accepted at the university.

A different kind of problem, to me as a teacher and to other Swedish students, was that some of the beginners of French were born in French-speaking countries like Tunisia and Morocco. They applied for the beginners course, even though they were fluent in French. Since there was no rule against this, they were accepted and so we started talking about "true" and "false" beginners.

The situation in the classroom was one of frustration. The "true" beginners felt inferior "they didn't know any French" and the "false" beginners were bored "they already knew everything", I, the teacher... Well, what could I do? Usually the textbook was at the centre of the teaching even though nobody really benefited from it. I looked upon the heterogeneous group of students, as a problem, not a challenge. I focused on the word "different" in the meaning of "impossible". Different nationalities, different education, different traditions, different opinions of learning, well, there seemed no end to the list, and still, I wanted to go on teaching French and in order to do so I needed students. In fact, everybody I talked to, other teachers and the headmaster, they all wanted French on the timetable.

Learning a foreign language gives the possibility to develop a deeper understanding of different cultures. It makes it possible to communicate with other people and it is also a personal challenge. The situation we were in made it impossible for us to experience any positive development. We found ourselves in a situation where we had to choose: to give up teaching French or to do something. We called the project "French for You".

Changing directions

When adults start studying it is generally assumed that they know what to do. It is taken for granted that, as a student you do your best, you spend a lot of time with your textbooks and of course you attend lessons. But the actual process of learning is seldom discussed. It is said that adults are not as good at learning by heart as young people are, even so the method of repeating rather than revising is commonly used. We started by learning more about our students. They were all above twenty years of age, many had

a family, most of them had some kind of professional training. All of them had experiences of school, teachers and studying. To enhance learning we wanted to create a climate of “learning from each other”. The idea was that instead of looking upon differences as a potential problem, we would look upon differences as an asset. The students themselves, their questions, their attitude to foreign languages and learning would be the starting point for classroom activities. In doing so, we would create a situation where our differences would be what we initially had in common.

By asking questions and answering in different ways we would be able to show that answers generally are not “correct or incorrect” but merely different.

When we started the project our goal was to increase the number of students of French.

Also we wanted the students to look upon their studies as “fun” rather than “difficult”. Studying French would mean learning to learn a foreign language. Learning would mean that the students would co-operate and communicate with each other. The fact that we are different individuals with different experiences was regarded as a possibility to learn from each other.

“French for You” – a presentation

I will now describe some essential aspects of the project “French for You” from the point of view of learning to learn, flexible learning, student influence and communication. The examples I have chosen to present are meant to give an idea of how we worked. They are in no way meant to be “recipes”.

Learning to learn

Different people learn in different ways, being a student does not change that. But somehow it is assumed that when you walk into a classroom you are reduced to someone who does not know anything, about the subject or about how to learn. The teacher turns into a person who, without even knowing you, still knows what you should study and also how you should study. It is important that this idea of the relation between the teacher and the student is changed.

Of course the student knows more about himself than the teacher does. Of course the student knows a lot about the subject being taught and how to learn. But, he might not be aware of it. He might view his knowledge and experience as not having value in the present situation, in the classroom. This is why learning to learn must be a part of learning a foreign language.

In my classroom, learning to learn means that the students discuss questions on how to learn.

I present examples that they have to connect to different situations and also I give the students tasks of a reflective character. The idea behind is to support them in finding their own way of studying, their learning style.

In a traditional language course, the students have the same textbook. This textbook usually offers texts, questions on the content and word lists. The answer to the question of what words to learn is therefore obvious; the words in the word list. In my classroom, where the students choose their literature themselves, the question of what words to learn is always present. It is indeed obvious that there is no list to learn, but should we make up a list together or...

Here, learning to learn means that the student, with the support of his teacher, develops his own concept of learning words, actively trying out different ways, being challenged by his teacher and fellow students, learning to reflect on the very process of learning and different strategies for it. Learning to learn also means learning to be an independent learner, who develops different strategies for different tasks. The difference between repeating and revising words is one example of a starting point for reflection on how to learn new words.

Flexible learning

When we started this project four years ago, I was not very familiar with the concept of “flexible learning”. Now I know that the concept is used in different ways, and I intend to give my definition of it by describing how we have used flexible learning in “French for You”.

What brought our attention to the possibilities of flexible learning was the fact that our students could not always attend lessons. The students were more independent than before, they took on more responsibility, the results were better, but of course students were absent now and then which meant that there was frustration when they came back. This called for a change in our attitude to attendance, or to the concept of “being present”. We did not have a textbook in common, and we did not want one either, but we needed something that would make it possible for the students to be “present”, even though they were not in the classroom. Writing a study guide was the start of flexible learning in our project.

The study guide presents the course to the students. The goals, the tasks, what is to be presented and what is to be handed in, it is all in the study guide. The students are encouraged to read about what they are supposed to do, before they actually do it. In doing so, they can plan their studies, when to do what, being present in the classroom or not is not a big issue any more. To study and to learn is what is focused, not where and when.

Working with a study guide also allows students to have a flexible approach to literature. They are all given the same tasks, how they deal with them, they can decide themselves. This includes where to look for information.

Student influence

When I started working within adult education, the students of French were diagnosed in the beginning of the term. According to the result, they were assigned to different courses, which usually were talked about as different levels. What is easy, and what is difficult, is indeed a very delicate question. What level language students “belong to” is a question of the same kind. What is it that a student on a basic level doesn’t know, that a student on an advanced level knows? At the heart of this question is an assumption of knowledge as something that can be measured, that can be quantified. Tests are instruments of finding out “how much” a student knows. To change direction we had to find another way of dealing with courses and levels.

Our first step was to ask the students to evaluate themselves. We proposed three different levels “beginner”, “intermediate”, and “advanced”. We encouraged the students to try different groups and to think hard before they made their choice. This worked out very well, and we realised that we had found a new dimension of student influence. Later on, we have developed this aspect of student influence by not using groups or levels at all. The students now choose to study French, they make their own planning, which is discussed with the teacher, and finally after about a month the student decides what course he or she will be assigned to.

The point I want to stress here is that developing student influence is a very efficient way of supporting the student to take on responsibility and to be a serious student. Being able to decide what course you want to take after your studies have started is one important aspect of student influence.

Another aspect of student influence is the question of literature. What textbooks should be part of the course? How many pages should a beginner read? Does every student of French have to have a grammar book? These questions are examples of questions that the students asked, and still ask, in the beginning of the course.

Initially, they think it is the responsibility of the teacher to give a straightforward answer to the questions asked, that is to give the title of the textbook, the number of pages and yes or no, on the question about having a grammar book. By not answering in this way, but instead by asking the students the same questions, we got a starting-point for discussing the same questions.

Whenever people, not only students, start talking with each other, giving reasons for their opinions and asking questions when they don’t understand, they become involved. Once you are involved in

something, it means that you are a part of it, in this case of choosing literature. The students found themselves responsible for looking for textbooks, newspapers, magazines and internet sites that they thought would support them in their language studies. When evaluating I always ask the students if they think that they have an influence over their studies. Almost everybody answers yes, and as examples they often bring up the fact that they could choose their own literature.

Again, I would like to stress the point that what in traditional teaching usually is regarded as “natural”, for example that the teacher knows best what literature to study, is in fact what makes student influence into a question of "voting for what day of the week to write the test". I mean that student influence is at the heart of learning. Learning is an active process, where the learner looks for similarities and differences, tries to see the point of what is being presented and where it is indeed the learner who is the one that makes learning happen.

Communication

Most people start learning a foreign language because they want to be able to communicate with other people from different countries. This is also true about our students who want to learn French. When asked, almost all of them say that they want to learn to speak French and that they want to visit France and other countries where French is spoken. In school, it takes a great deal to create an atmosphere which supports students to use the foreign language they are learning when working together. Even though they really want to, there is a lot that works against it. They might not know each other very well or they may find the situation artificial. Not speaking French will also mean that they gain a lot of time, since it is "easier" to speak Swedish. Generally speaking, you can say that students rather focus on solving the task than on the process of solving it. They value the result, the text written or the play they perform more than they value the discussions behind. If we add the fact, that many students see language learning as a kind of translation exercise, it is not hard to understand that Swedish is commonly used, although the idea is to learn French.

In “French for You” I have structured the course into different themes. All students work within the same theme, the same “frame”. They also work towards the same goals and in doing so there is every reason to work together, and to learn from each other. The last few years in Sweden there has been a continuous discussion about group work versus individual work. What I want to stress here is that it is important that every individual can choose what aspect to work with and how to work. Working with themes allows everybody to do this. It is not the teacher who decides what to work with and with whom. The student himself is the one that decides. This allows different people with different ideas and different backgrounds to actually work together sharing information, ideas and questions. Since everybody works within the same theme, they all have something in common.

Communication in this respect means sharing, telling and listening. It also makes it more natural for students to use the foreign language they are learning, in this case French, because they work with the same theme. In the beginning of a theme there is a lot of discussions in Swedish, because they haven't learnt how to phrase what they want to say in French, yet. With time they use more and more French and at the end of the theme, they almost only speak French. This is a dramatic change, and the students themselves notice that actually they are learning. The focus on grammar and correctness that many students have in the beginning of a course is shifted towards a focus on understanding. What is correct and not, cannot be decided without considering the context, the people, the situation and the subject. In my opinion, this is at the heart of language learning and of communication.

Next step

Learning to learn, student influence, flexible learning and communication are all integral parts of learning. Learning is an active process, and to support learning it is necessary to have an open mind and a wish to know more. Learning is also a painful process where you are constantly reminded of the fact that there is always more to learn. What you looked upon as “the truth” or “a fact” some time ago may no longer be so. This is something we all share, teachers as well as students. Working together supports learning and it also gives courage to go on learning.

Since “French for You” started I have learnt a lot. I have learnt to listen to people and I have learnt that there are always many different answers to every question. “French for You” has also meant that we have more students of French today and that we have been able to offer students different ways of studying. In the autumn of 2001 we will take one step further and offer “French for You – flexible learning“, which will be a combination of distance learning and classroom activities. The students can choose to attend classroom activities on weekdays or Saturdays, and there will be group meetings on weekdays. Every student will write his own individual plan, and of course, there will be a study guide. We hope that by offering flexible learning, we will make it possible for more people to study French.

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COMPONENT-BASED COLLABORATIVE LEARNING TOOLS

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Introduction

According to D.W. Johnson and R.T. Johnson [1] there are three different ways to carry out the learning process: Individualistic Learning, Competitive Learning and Cooperative Learning. Conventional education copes with all of them. Distance education systems based on new technologies can provide the first but also the latter two ways. Networked systems provide communication channels among the different agents involved in the learning process. Over them, we can use the appropriate tools to turn computer networks into a real virtual classroom: e-mail, chats, virtual meetings, videoconference, shared file systems, etc. Therefore, isolation can be avoided and users are able to get in touch with each other.

In fact, many of the currently available Internet-based educational systems include some communication tools that allow their users to share information. However, most of them are generic communication tools for Internet environments. This solution presents two fundamental problems:

- Clients of the educational system: students and teachers, have to install and configure the software. This may become a cumbersome task for inexperienced users.
- Generic tools do not meet any specific pedagogical criteria.

In this paper, we present several communication tools to allow Internet based co-operative learning. All of them were developed from scratch to meet the particular requirements of the educational process and they can be easily incorporated in new learning platforms thanks to their modular architecture and the API they provide. Section 6 detail how developers could include our tools in their e-learning systems in an easy and straightforward way. Educational systems that make use of them will provide their clients with an easy-to-use set of communication tools. Learners and tutors do not require to set up or use additional software as the needed software elements (based on Java computing) are automatically downloaded from the network and can be run wherever the user may be, regardless of the particular hardware platform or operating system.

The Mail Tool

This tool, based on the standard electronic mail, allows any client to receive messages from other users as well as to send any suggestion or comment to: a student, a teacher, all students in a course, all teachers who are responsible for a course, a group of students or teachers or to the system manager. It can be used by teachers to send training practice instructions to their students, any by these to return their results and conclusions, to share experiences among students and to send comments to the system manager.

Although the Mail tool is directly based on the standard Internet e-mail service, it presents a set of particular characteristics that convert it in more appropriate for educational environments. The most relevant characteristic is that clients are automatically provided with a useful address book. It is sent through the network to the user's computer containing up to date information about the members of a particular course. Users are organised by different criteria (see Figure 1) and, therefore, it is very easy to find a possible addressee (both individuals and groups).

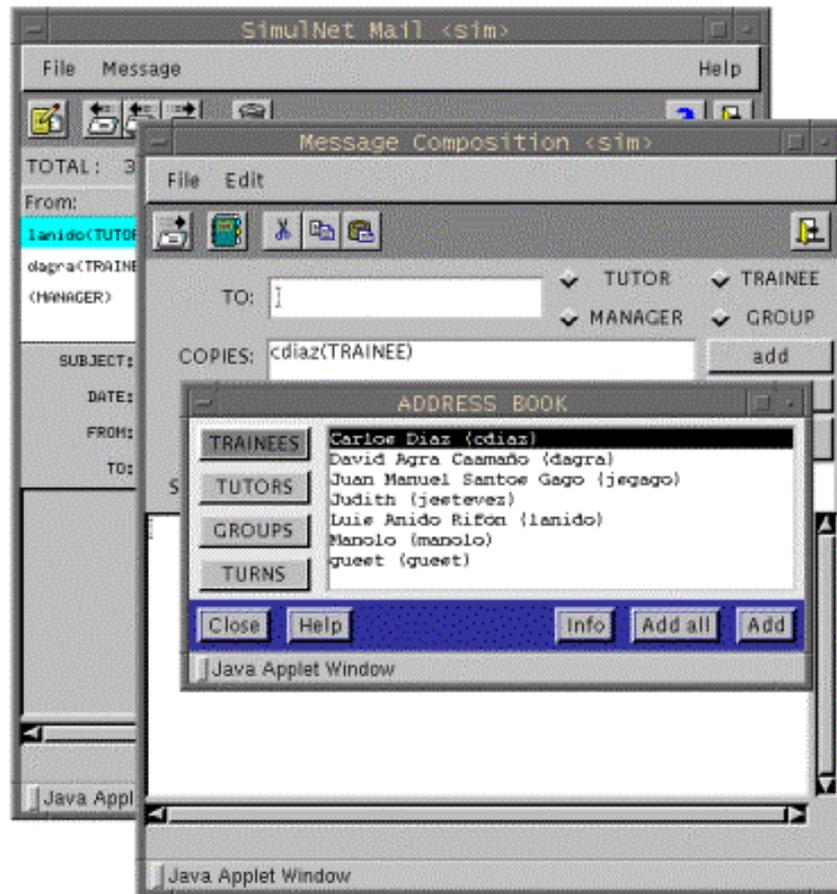


Figure 1: The Mail Tool

The Bulletin Board

The bulletin board is based on the news service in Internet. Every user can post public notes to it, and these notes can be read by any other user. Its main aim is to become a platform to share information. Users are allowed to post two kinds of documents:

- *Public notes.* They can be read by any user.
- *Private notes.* The bulletin board can be used as a private information store. Those documents posted as "private" can only be read by its author, or other user with higher privileges, as explained below.

There are four defined types of users with different privileges: students, teachers, teachers with higher privileges and the manager. Users can access public bulletins, their own private bulletins and those private notes that belong to users with lower privileges (e.g. teachers can read students' private notes).

Whenever a user wants to refresh the contents of her/his board, she/he is allowed to select the types of documents that this user will download from those she/he is allowed to access to (see Figure 2). In addition users can select to download only those documents related to a particular bulletin. After downloading different types of documents, users may get lost and forget what type of bulletins they have in their board. To avoid this, our tool provides information about whatever kind of bulletins they have downloaded, and, if appropriate, the actual subjects the documents are related to.

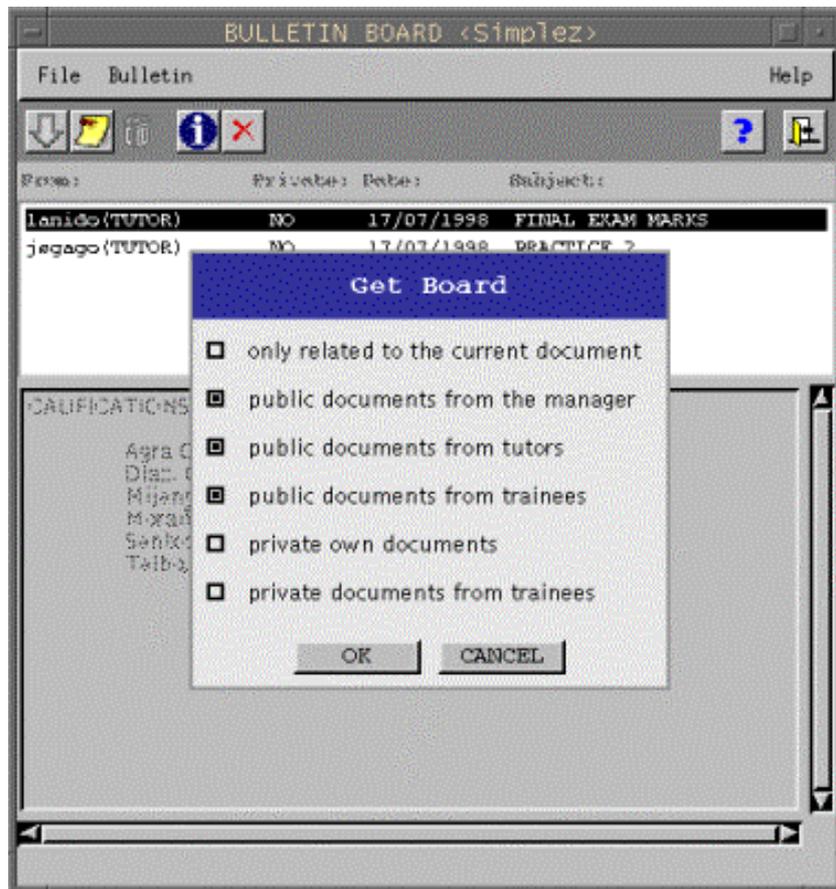


Figure 2: The Bulletin Board

The Multi-talk Tool

The main purpose of this tool is to allow a group users to get in contact with each other in a virtual room. Users are allowed to "talk" with each other in two different ways:

- *Debate.* Everybody involved in the communication can introduce information in the virtual conversation without restriction. This information is shown to any other user in the virtual room.
- *Lecture mode.* Only the user that acts as the "moderator" can introduce information that will be shown on every other user's display. The first user who starts a conversation, or the first teacher involved, would act as the moderator. He or she would be able to change between the two communication modes and involve or detach new users from the active connection.

This tool can be very useful to solve students' usual doubts or teach any topic related to the current training practice. In this way, there is no need for teachers to have to repeat the same explanation to different students, and therefore, tutors are able to concentrate on monitoring their students' progress.

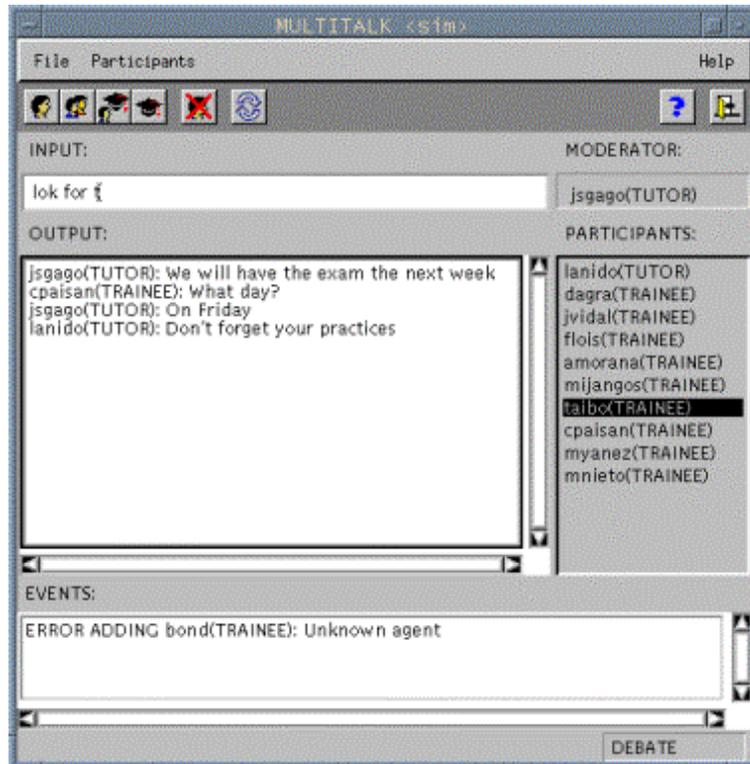


Figure 3: The Multi-talk Tool

The Talk Tool

This tool allows private conversations between two users, students and/or teachers. Whenever a user wants to establish a conversation with another one, a request is sent to the latter. If he or she accepts, the communication starts at once. If the starter is a student who requests to have a talk session with a teacher, the latter has several options: reject the talk session, accept it or include this student in any of the active multi-talk sessions moderated by him or her.

Users of the talk and multi-talk tools are provided with a functionality that allow them to know which students or tutors are connected to the system at any time.

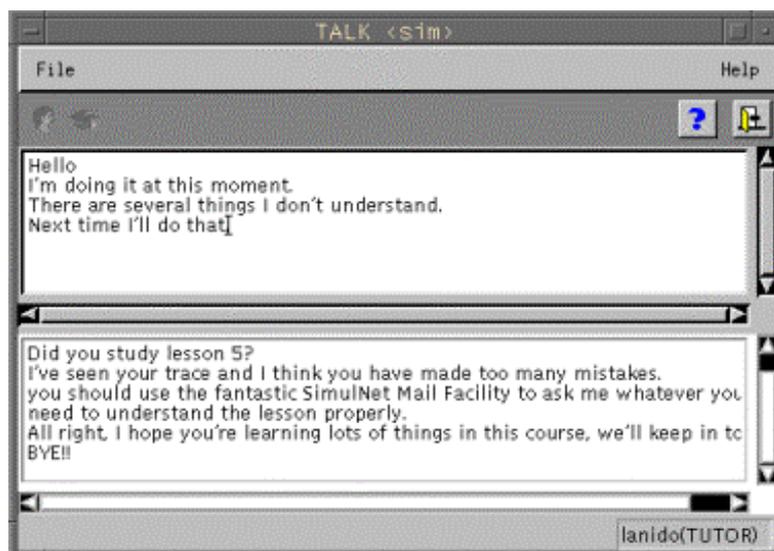


Figure 4: The Talk Tool

System Architecture

In the development of our communications system, two special technical restrictions were taken into account:

1. The system must be platform independent. This restriction was undertaken implementing the components in Java.
2. The system must be easily incorporated in heterogeneous learning servers. To achieve this, coupling between educational systems and our communications system must be reduced to the minimum.

The final system consists of an independent web application, developed using Java Servlets technology [2], which receives information about the users of the educational environment from the learning server through a XML-formatted [3] data file. Figure 5 shows the high level architecture of the communications system. Integration of a particular educational system with the communications system at the client side can be made by adding the web page shown in the Figure 5 (initialised with the identifier of the student or teacher) into the web pages of the educational platform as an independent frame.

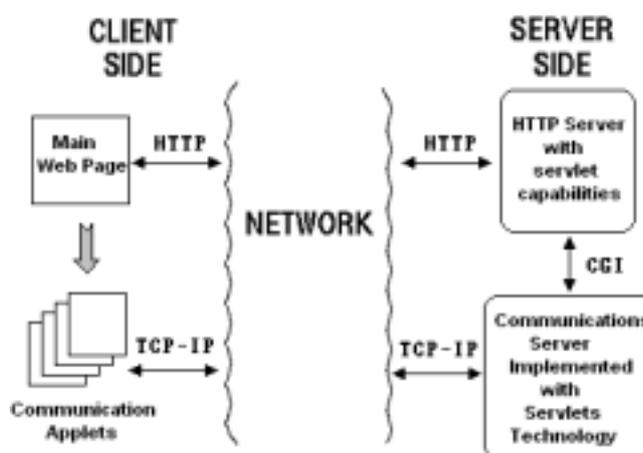


Figure 5: System Architecture

Figure 6 shows how information is transferred from the particular learning server to the communications server. The learning server is responsible for maintaining an up-to-date XML file containing a set of records with data about all the clients of the educational platform. The communications server will use that file to assign the necessary resources to each user, such as a mailbox, and to perform the corresponding internal management of users. When the communications server is installed, it must be provided with the location of the XML document and the refresh time to check for modifications in the file.

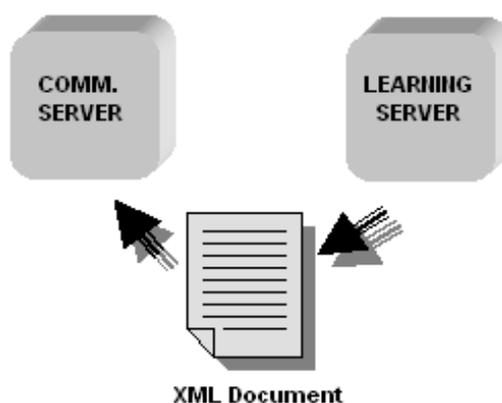


Figure 6: Information Transfer

Adoption of a XML-based format for information transferring was chosen because of its portability among different operating systems and because it's easy to find tools to manage them.

Conclusion

With our web based communications system we got a integrated set of communication tools that can be included in a e-learning platform, providing their users with an easy to use way to get in touch with other users. Students and tutors are not required to install or configure any additional software as the needed software is automatically made available by the system. The communication tools provided are based in well known Internet services, but conveniently adapted to meet the particular requirements of the educational process.

The communications system has been incorporated into our instructional platform SimulNet [4] in order to test its feasibility and functionality, and the results have been highly satisfactory.

But the work is not finished yet. Actually we are working in two different lines:

- Incorporation of new tools such as a virtual whiteboard.
- Adoption of standardised models for user profiles (as those proposed by the PAPI specification [5] from the IEEE's LTSC, or the Enterprise specification [6] from the IMS Global Learning Consortium) to be used in the information transfer between the learning server and our communications server (see Figure 6).

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PREPARING THE NEXT GENERATION OF LEARNING: ENHANCING LEARNING OPPORTUNITIES BY WEB BASED COOPERATION

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Introduction

Though, originally, the WWW was intended primarily for the distribution of multimedia information, it can be used successfully for enabling and supporting cooperative work in education and training. In this paper, we present the BSCW system (Basic Support for Cooperative Work). It uses the World Wide Web as a platform for communication and offers a number of functions for supporting collaboration. The emergence and widespread adoption of the World-Wide Web offers great potential in supporting cross-platform cooperative activities within widely dispersed working groups. The BSCW project at the German National Research Center for Information Technology (GMD) is attempting to realize this potential by development of Web-based tools providing cross-platform multimedia collaboration services to groups. Today BSCW is installed on about 1000 servers around the world, 400 of them in educational institutions, i.e. the current user community comprises several ten thousands of active users.

WEB based Learning today

The demand for qualifications in our information society has changed over the years as well as contents and the organizational form of the courses that are offered. How students learn may be as important as what they learn, and may determine how much they learn, and how they continue to think and inquire. Global learning needs to take flexible, adaptable forms. The recipients will not be uniformly prepared. Their skills, knowledge and disposition may be very different. So may their purposes: global learning will be variously used. Teachers and students, institutions and individuals need to be able to use global learning in their own ways, to make the learning useful and also to prepare the learner to think independently, even originally.

WEB based Cooperation with BSCW

Even today, the platform-independent cooperation in geographically distributed projects is often a difficult problem. So far the Internet has provided support for this problem only to a limited extent [1]. With the BSCW system, GMD in Sankt Augustin has developed a WEB-based platform for cooperation support which extends the possibilities of the World Wide Web considerably. The use of the WWW offers several advantages in parallel. The WWW is platform independent because WWW browsers are available for all standard operating systems such as the different Windows and Unix variants and Macintosh OS. The handling of the WWW browsers is easy to learn and obviously fulfils the basic user requirements as is shown by the widespread use of WWW technology - even for users without thorough computer knowledge [6]. Furthermore, many organizations, including schools, have already installed WWW servers for multimedia purposes and are familiar with the relevant technology. This means a functional extension of WWW servers for cooperation support - and the BSCW system developed by us is such an extension - would not involve additional problems for the organizations.

The basic idea of the BSCW system is the autonomously managed Shared Workspace which the members of a working group install and use for the organization and coordination of their tasks [5]. The members of the working group can upload multimedia objects from their local computer to the workspace as well as access those objects in the workspace, e.g. for processing them. Such a workspace can contain different types of (electronic) objects such as folders, documents, photos, videos, tables, graphics or links to WWW pages [3]. In addition to the comfortable document management, there are a notification service providing information about current activities and a great number of functions and object types for more extensive support of cooperation. The user of the system only requires one of the usual browsers such as Netscape Navigator or Microsoft Internet Explorer.

For telecooperation purposes the metaphor of a shared workspace is an interesting one because limitations caused by distances in time and space can be compensated. The shared workspace is the central access point for common data and information about the state of the work process [2]. Existing prototype shared workspace systems offer the following attributes and features:

- *containers* to store and retrieve *resources*,
- administration of *members* of a shared workspace,
- generation and distribution of *meta-information*.

In this context the Web has a number of distinct advantages as the basis for tools to support collaborative information sharing. Even if cooperating organizations agree on a common groupware product, they still have to cope with interoperability and service problems. This problem very often consumes lots of resources, that are not available in workgroups that are only cooperating for a limited period of time.

GMD, very often involved in many international research and development projects, started a pilot study in 1995 to investigate the applicability of the World-Wide Web technology for the development of a shared workspace system. As that study was very promising the design and implementation of the BSCW system started at the end of 1995 [4].

Before going into details here are some motivational remarks for using the WWW as a cooperation infrastructure:

- The WWW is platform independent, browsers exist for nearly every operating system like Windows, UNIX and MAC-OS.
- The handling of WWW browsers is easy to learn and non computer science people are using them without problems [7].
- WWW browsers are in common use in many organizations and no additional implementation and service overhead is necessary.

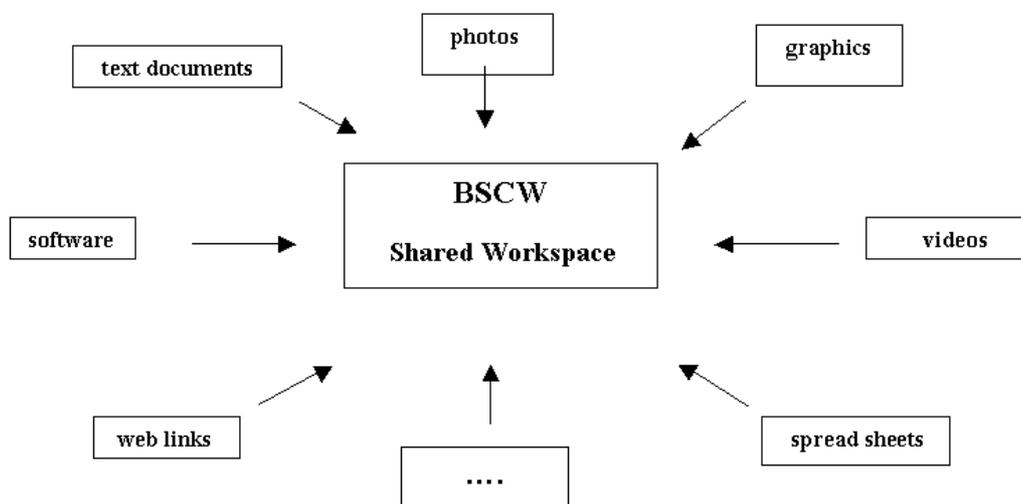


Figure 1 The potential contents of a shared workspace

BSCW as a group communication platform allows for new ways of work in an educational environment:

- a) for teleworking purposes BSCW is low-cost in terms of administration effort, bandwidth, software-prerequisites and - available from anywhere - the same environment can be used from at home as well as from within the office;
- b) when traveling every computer on the Internet equipped with a standard browser at the airport, in your hotel room or in an Internet cafe may serve as your personal BSCW terminal in order to access your company's data anywhere at any time;

- c) for small but growing learner communities with yet an infrastructure to develop the BSCW system is an ideal tool in order to support flexible groups and to establish informal communication channels and coordination mechanisms;
- d) for any kind of decentralized organizations or centralized organizations involved in cross-organizational learning projects BSCW is a candidate for the strategic IT communication link;
- e) in order to start with BSCW the system integrates into any user's normal work environment and does not impose data formats onto the end-users.

The development of the system has been and partially funded by the EU's Telematics Applications Programme within the CoopWWW (1997-1998) and CESAR (1998-1999) projects carried out by several European partners under the leadership of GMD.

In the course of the years until today the system was shaped based on hundreds of user requirements. BSCW today provides a great variety of functions which support the cooperation of the members of a working group [2]:

- The system records all "events" occurring in a workspace. An event is triggered by any access to a workspace. This can be, for example, the storing of an article, a contribution to a discussion or the suggestion of a deadline. If a document is read or if its title is modified, this will also trigger an event. If users "enter" a BSCW Shared Workspace, they are informed about the events that happened in the past. In this way, every member of a working group receives information about the activities of the other members (with respect to the objects in the workspace). Though this event-based approach to mutual information about the activities of the members is rather simple, messages such as "Pete stored a new version of the document 'Project state'" or "Dr. Webber read the document 'Weekly work'" often contains sufficient meta information to control the next steps of cooperation in the group.
- Users can also receive the notification about activities in BSCW workspaces via e-mail. If they register for this service, they daily receive an e-mail message about the events in their workspaces. The users can also define the type of events they want to be informed about (e.g. only about the integration of new documents or the modification of documents, but not about read events).
- The members of a working group may have different access rights for the objects in an workspace. The originator of a document can determine, for example, that specific members are entitled to modify a document while other members shall have only read access or no access at all.
- The BSCW system provides functions for the management of the members of a shared workspace, for example, inviting members or canceling invitations which is to be done by members authorized to do so. The access to the workspace is controlled by the system inquiring about user name and password. Furthermore, a user can enter additional information such as e-mail address, telephone numbers or fax numbers.
- Though the BSCW system is intended primarily for asynchronous, i.e. deferred communication, it also contains interfaces to synchronous communication tools such as audio/video conference systems or application sharing, i.e. the shared use of applications. This enables the user to define so-called "meetings" in BSCW workspaces and to activate the corresponding tools comfortably from the workspaces when those meetings take place.

The Design of a User Interface for Groupware Purposes

The BSCW server is an extension of standard WWW servers, that is, the basis is a HTTP demon which is enhanced by additional software implementing the BSCW functionality. Almost every WWW Server can be extended to a BSCW Server. Installations of the system have been done under a great number of Unix versions as well as under Windows NT. The Apache Server and the Microsoft NT Internet Information Server, for example, are being used as Web servers as well.

The implementation of the user interface is almost "language independent": All texts which the system uses for communication with the user are stored separately from the actual code. To create a BSCW interface for a specific language, these texts must only be made available in a corresponding form which requires the translation of a number of HTML pages. Knowledge about the software is not required for

this purpose. Currently, German, English, French, Italian, Spanish, Russian, Greek and Catalan are available.

BSCW clients are standard WWW browsers. Since the system users usually want to store also objects in the shared workspaces on a BSCW server, the used browser should support the transmission of local files to a WWW server (such as the Netscape and Microsoft servers).

Being entirely based on Web technology, the user interface of the BSCW system is essentially a set of HTML pages. The BSCW server generates a HTML response page "on the fly" whenever users send a request from their Web browsers to the server, e.g., the request to list the contents of a folder. The response pages reflect the state of a workspace as seen from the viewpoint of an individual user and thus may vary from user to user. However, Web technology comes with some constraints which inhibit the deployment of applications that require features such as rich user interfaces, synchronous communication or information replication. The current Web protocols and standards hide much of the complexity of deploying applications in a distributed, heterogeneous environment. Extending a Web server via CGI and presenting the user interface to the application as a series of HTML pages (as done with BSCW) is a convenient method for the development of applications that can be accessed by standard Web browsers. However, developers must also accept the constraints of the rudimentary client/server architecture of the Web, its protocols and limitations of the browsers themselves. Although HTML provides a set of standard user interface widgets such as buttons and text fields, it is not a user interface toolkit and cannot be used to develop advanced user interfaces. HTML is suitable for simple form-oriented interfaces, but does not offer modern interaction styles to the user. The lack of menu bars, for example, implies that all possible operations are always a 'mouse-click away' from the user. In BSCW with its large set of features this has led to a cluttered user interface which complicates usage of the system for unexperienced users. Now we provide means to remove buttons from the interface to make it simpler.

Another requirement of interactive systems, responsiveness, is also not met by current Web technology. Because Web browsers basically are 'dumb clients' all computation needs to be done on the server side. Even though this simplifies browser development it impedes interactive application behavior. Combined with poor network connections this makes usage of Web based applications a painful experience. In BSCW this can be experienced while trying to locate a document deep down in the folder hierarchy.

Current Web technology lacks fundamental support for the development of highly configurable systems: because all application state information has to be stored on server side, this requires central administration of user preferences and complex computation of tailored user interfaces. We have put a lot of effort into the provision of a high degree of tailorability in BSCW with satisfactory results, which obviously would have been much easier with adequate support by the underlying technology. For a novice user the interfaces of earlier BSCW versions were cluttered with "too many buttons", "too many kinds of objects" and "too many features". The number of such comments increased and became more urgent with the release of a new version when we again had added a number of new features. It should be noted that all features that have been built into the system in the meantime were inspired from feedback from our users who asked for such extensions. While some users felt that the user interface had become too complicated and cluttered, other users even enhanced the system by adding new features themselves.

The new version 4 of the system, released in June 2001, was the result of turning user feed-back into system functionality. Version 4 focussed on a complete redesign of the user interface on the one hand and on functional enhancements on the other hand. The new interface was the answer to many users' complaints of BSCW being too complicated to use and its interface being too cluttered with icons and operations. Without reducing system functionality we tidied up the new interface by introducing menus wherever possible. Additionally, the users can now influence not only the subset of system functions they want to use (and see), but they now can also configure the granularity of information details they want to be confronted with. This greatly helps users to more clearly arrange their data and more efficiently use BSCW's vast amount of functionality. By using Javascript, part of the system functionality may now be executed at client side which reduces system response times. The new context related help facility helps the user find his/her way through the system and further tidies up the user interface.

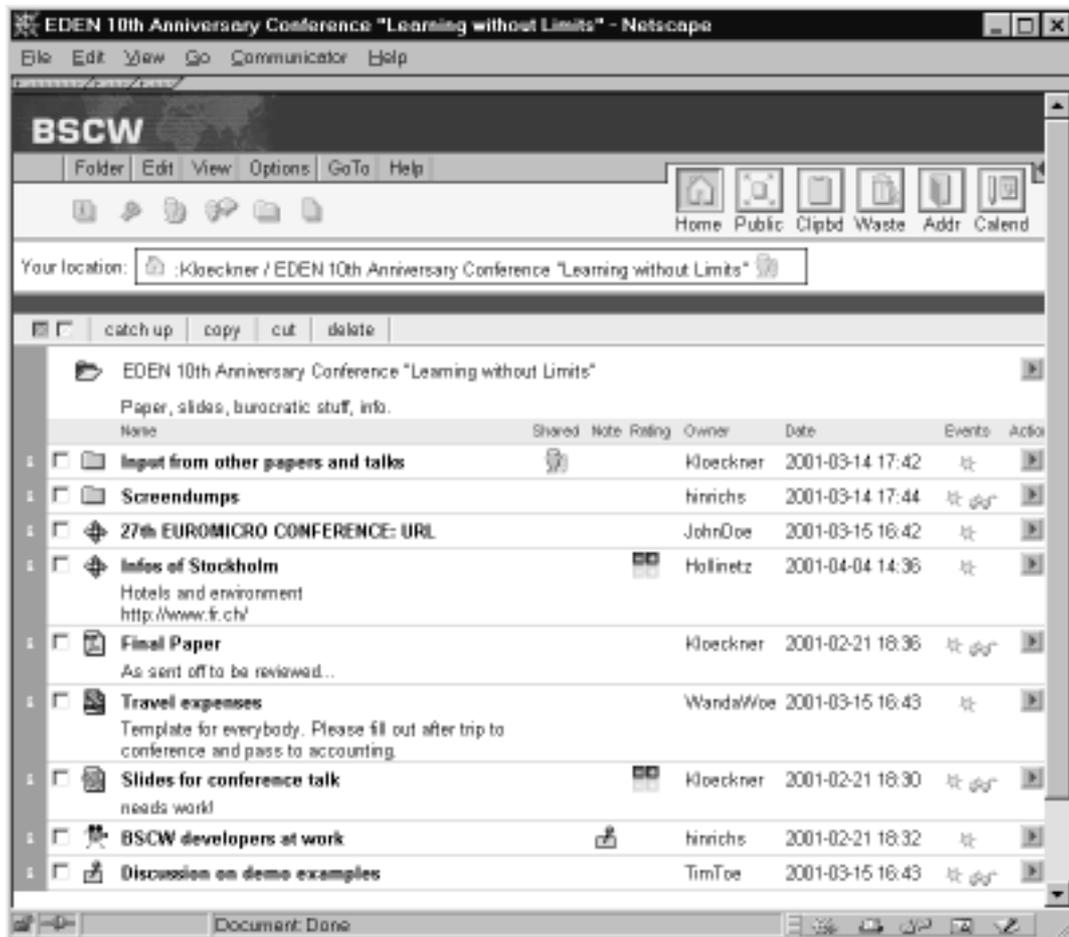


Figure 2 The new BSCW User Interface

The new Document Factory facilitates a comfortable management of a document site which is continually revised and periodically published. Based on the concept of hierarchically structured templates, the Document Factory helps reduce text redundancies and ensures a consistent and common structure. An "export" function may be periodically invoked to publish new versions of documents to a public FTP site. The Document Factory is most useful for but not restricted to Web-Site management. Finally, a new calendar tool supports the coordination of any synchronous and asynchronous workgroup events; the Calendar combines private event management with group calendar functionality.

Conclusions

The BSCW system extends the World Wide Web by shared workspaces. In addition to a tool for information distribution, the user is thus provided with the facility of solving problems cooperatively with other users independently of the hardware and operating system of the used client computers. Consequently, the BSCW system constitutes an adequate for the shared decentralized and deferred management of projects. The BSCW system has been made available for general use at GMD's public BSCW server <http://bscw.gmd.de> since its initial release in 1995. Everybody is invited to register and create workspaces for co-operation with friends and colleagues – free of charge.

The experiences gathered in the last six years show that BSCW is able to solve some of the main tasks in the large field of telecooperation in education. The whole development of the BSCW system is done in close cooperation with our user groups in research, education and a variety of different companies. At present more than 50,000 people are registered on this server, located from Australia to Zimbabwe, creating about 500 Mbyte data exchange on this server per day. Today BSCW is installed on about 1000 servers around the world, 400 of them in educational institutions, i.e. the current user community comprises several ten thousands of active users.

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SUPPORTING INSTRUCTIONAL DESIGN IN DISTANCE EDUCATION (IDDE): A WEB-BASED PERFORMANCE SUPPORT SYSTEM

Chad S. Carr, Ph.D., Andersen and The Open University of The Netherlands, Amy M. Carr, Andersen

Introduction: Design of Distance Education is Driven by Media

Over the last decade, as technology has become capable of delivering text, audio and video at a distance (Deloughry, 1998), corporations and academic institutions continue to investigate ways to integrate distance education (DE) and distance learning in the design of their teaching programs. Universities have launched initiatives to deliver courses entirely via audio or video conferencing, the Internet, and the World Wide Web (WWW). Corporate universities have been busy developing their own Intranets to support knowledge-sharing and internal training. With the significant increases in technological advancements, the amount of time teachers and instructional designers spend examining new technologies to understand their capabilities is substantial.

Consequently, there has been a tendency for educators and designers to focus their efforts on the technological issues associated with the delivery of such programs. As a result, much of the instruction delivered at a distance tends to be driven more by the technology than by instructional principles. For example, consider the recent advent of streaming technology, which allows developers to broadcast audio and video over the World Wide Web (WWW). Some university professors became charged over the technological application, with the immediate result being the use of streaming audio on the WWW to simply allow their student hear the same class lectures that made them drowsy during a normal class. Similarly, when instructional designers recognized the hyper-linked capabilities of the WWW, they saw direct application of the functionality; they moved their paper-based materials to the WWW, maintaining the linear composition of the materials, but allowing learners to ‘click’ to turn the pages of the lessons. The result is called “interactive training.” By this, we are left to assume that they apply a definition of interaction that would include any use of a computer-based input device (mouse, keyboard, etc.) during an entire session. We are not arguing that linear, sequential instruction delivered via the WWW is always ineffective, but simply that transforming paper materials to the web (as an example of distance education) often does not involve the application of instructional theories while considering the capabilities of the WWW. Further, we argue that the selection of delivery media in the development of distance education courses often involves analysis of the capabilities of the technology (e.g., computer-mediated conferencing, web-based instruction, etc.) as opposed to the ways in which the learning outcomes and strategies can be supported by the technology.

Towards the Solution: Design of Distance Education Driven by Instructional Theory

According to Cookson (1990), “The aim of distance education programs is to engage students in effective learning so as to attain certain specified and desired outcomes.” Distance education will be more effective when developers focus on integrating instructional strategies that address learning outcomes as they consider the affordances of the delivery media (e.g., internet, intranet, web-based training, etc.). The availability and utilization of information and communication technologies alone are not enough for distance learning and distance training to succeed (Visser 1997). To realize the full potential of distance learning, designers and developers must apply an analytical approach to the design and utilization of distance learning media and methodology (Pisel, 1995; Schreiber 1998). As Schreiber (1998) suggests, a clear understanding of the instructional needs of the training program will drive appropriately chosen instructional methodologies, effective selection of instructional media, and ultimately successful implementation of distance learning. As Clark (1994) discusses (after reviewing decades of media-comparison studies), it is *not the media* that affects learning outcomes, but the *instructional strategies used in combination with various media*.

Introducing IDDE: Our Web-based Performance Support Tool

It was our intention to develop performance support tool that would assist educators and designers in selecting and integrating instructional strategies into their distance education courses. Other

considerations included the desire to ensure that learners’ differences were supported within the solution and to enrich the learning environment with additional resources over time. Further, we wanted to make this performance support tool available to all designers in the world. To achieve these outcomes, we designed a web-based electronic performance support system (EPSS). According to Gery (1989), an EPSS is “an integrated electronic environment which is available to and easily accessed by each employee and is structured to provide immediate, individualized online access to the full range of information, software, guidance, advice and assistance, data, images, tools and assessment and monitoring systems to permit him or her to perform his or her job with a minimum of support and intervention by others” (p. 65). Our web-based EPSS, Instructional Design in Distance Education (IDDE) (<http://ide.ed.psu.edu/idde>), provides a combination of instructional theories, strategies and tactics, examples, and images to help designers build effective distance education lessons. The tool allows users to peruse through resources that demonstrate how to apply instructional strategies within a selection of delivery media. These attributes meet our main target outcome of supporting designers in the design of new solutions. Secondly, the WWW was chosen as our delivery media for the tool to facilitate ongoing maintenance and enrichments to the examples demonstrating integration of instructional strategies into DE lessons. Additionally, we wanted to target users with varying goals and perspectives. As Puterbaugh, Rosenberg, and Sofman (1989) stated, “performance support tools are designed to improve worker productivity by supplying immediate access to integrated information– with scope and sequence controlled by the user.” The hypertext nature of the WWW was a desirable environment for such a tool. The WWW enabled us to design 3 different entry points, to allow each user to choose her own direction and access the specific support information she needs, as demonstrated in Figure 1. These *doors* into the tool will be described in more detail in the next section.



Figure 1 – IDDE Welcome Screen

Theoretical Foundation for the IDDE Tool

The Instructional Design in Distance Education (IDDE) tool is a web-based performance support tool that provides a combination of instructional theory and application for those designing distance education courses. The instructional information in the IDDE tool is adapted from the articles by Jonassen & Tessmer (1996) and Jonassen & Grabinger (1990), which provide a compendium of instructional classes, strategies, and tactics. Within the IDDE tool, these instructional elements are arranged as illustrated in Figure 2.

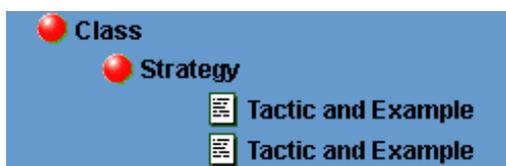


Figure 2 – Hierarchical arrangement of Instructional Class, Strategy, and Tactic

The specific instructional classes, strategies, and tactics that comprise the database of the IDDE tool are available at <http://ide.ed.psu.edu/ide/> and in Carr & Carr (2001). The tactics are based on the work of Jonassen et al., (1990) with some modifications. They are presented in the aforementioned 3-level hierarchical format, although the web-based IDDE tool also contains supplementary examples for the tactics. There are five Instructional Classes in IDDE: 1.0 Contextualize Instruction, 2.0 Present Lesson Content, 3.0 Activate Learner Processing, 4.0 Assess Learning, and 5.0 Sequence Instruction. The classes are made up of instructional strategies, which may be applied using specific instructional tactics and a variety of delivery media as demonstrated by the examples provided.

Accessing the Instructional Information in the IDDE Tool

As previously mentioned, the IDDE tool was designed to support multiple ways of accessing and conceptualizing instructional tactics. Users can access information in the tool by: 1) browsing the hierarchically arranged information for instructional classes, strategies and tactics, 2) viewing the instructional tactics, through instructional theory *lenses*, or by 3) searching the database by typing in keywords, such as ‘advance organizer’ or ‘audio conference.’

Navigating the Database. The interface of the IDDE tool allows student to peruse through the hierarchically-arranged database of instructional classes, strategies, tactics, and examples. For example, the learner may select an instructional class (e.g., Contextualize Instruction), instructional strategy (e.g., Gain Attention) and tactics for implementing the strategy (e.g., Arouse Learner). In Figure 3, the instructional tactic, arousing the learner, includes an example in which an animated picture of a beating heart is used to introduce a web-based lesson on the circulatory system.

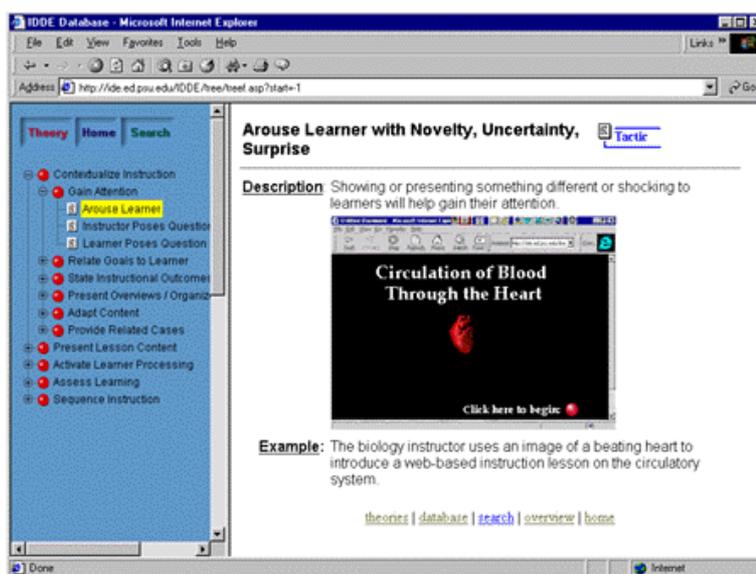


Figure 3: Navigating the IDDE Database

The examples consist of a visual representation of the tactic being carried out in a delivery medium (such as video, WWW, audio, etc.) and a brief written description.

Entering by Instructional Theories .

To help contextualize the learners’ understanding of the instructional strategies and tactics, we provided alternative lenses through which to enter the tool. Our lenses include familiar instructional theories (i.e., instructional recipes for success) such as Robert Gagne’s nine events of instruction (Driscoll, 1994), John Keller’s ARCS model for motivation, and Constructivist Learning Environments (CLE) (Jonassen, et al., 1998). For example, a learner might decide to apply Gagne’s nine events of instruction and, by clicking on any event, she will cue up the corresponding instructional class, strategies, or tactics in the database. (See Figure 4)

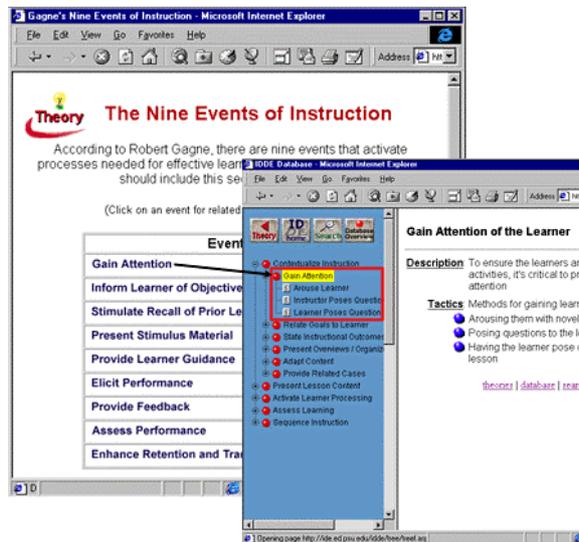


Figure 4 – Entering by Instructional Theory

Due to differences in the terminology that each author uses for her instructional theory, the titles used in the database are not perfected matches. However, the specific examples and instructional tactics within the cued branch of the database (see the red box in Figure 4 above) may still be applied to help support learning according to the instructional theory.

Searching the Tool. Learners can also search the database of instructional information by entering keywords (see Figure 5).



Figure 5 – IDDE Search Feature

Examples of keywords may include "objectives" or "video-conferencing." The keywords entered will access any instructional class, strategy or tactic resources within the tool. This functionality enables users to efficiently locate resources relevant to their specific need for instructional information.

Current Applications of the IDDE Tool

Based on site usage statistics, IDDE has become a popular learning tool on the WWW among users around the world. In fact, a number of designers and educators have contacted us directly, upon reviewing the site, to request integration of the IDDE tool into their e-learning courses. We have learned that IDDE is currently being used as a course support tool for higher education institutions in the U.S., Canada, Europe, and Australia and serves as an electronic performance support system for instructional designers in

corporate learning divisions. At Performance and Learning (Andersen's corporate university of approximately 450 training professionals), instructional designers who have considerable expertise in instructional design, find the tool useful as a quick way to review a broad range of instructional tactics very quickly. Thus far, the unsolicited feedback we have received has demonstrated that course designers have found substantial value in the tool. The unique attribute that has been most highly commended is the theory to practice element. We hope that designers and educators will continue to utilize this tool to design learning solutions that are founded on sound instructional principles, while considering technological capabilities.

Summary

As distance learning continues to become more prominent in the new economy, educators and designers need to increase their innovation in distance education, by designing for instructional effectiveness as opposed to designing for media utilization. As Clark (1994) affirms, it is not the media that affects learning outcomes, but the instructional strategies used in combination with various media. The combination of instructional theory and application in the IDDE tool provides an environment to support the successful integration of instructional design strategies in the design of distance learning solutions.

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HOW EDUCATION DESIGNERS CAN CREATE E-LEARNING ENVIRONMENTS WITH THE HELP OF A TECHNOLOGY PLATFORM WHICH THINKS LIKE THEY DO

dr. Romina Abbadini, Viviance AG new education

The desire to take advantage of the new media in education frequently brings together 2 key parties: the educators, who are strong in expertise, but limited in technological know-how, and computer engineers who are strong in software design, yet unaware of pedagogical concerns. Currently, these two groups are still separated by their disciplines. The content is developed by the educators and then given to the software engineers, who adapt it to fit the existing technological constraints. Unfortunately, this is not the correct approach for dynamic web based education.

Thinktanx 2.0. is an innovative authoring and delivering platform that supports directly the thinking process in the creation of online courses, helping the education designer, step by step. In the development of their course portal page and elearning modules, this platform provides different access ways, methods, services and communication tools while creating and storing the content in a flexible learning management system.

The presentation will show step by step how to create an online course with the aid of Thinktanx and its Thinkmap editor tool and how a finished course created by Viviance new education would look like.

The example I propose is an online environment to learn Spanish, developed for the Flemish Government. I will illustrate all its main educational features and functionalities supported by Thinktanx.

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FLEXIBLE LEARNING IN THE SWEDISH BASIC COMPULSORY SCHOOL?

Kåre Skantz, Sandvikens kommun

What does it take to become an e-learner?

"In the future there will be a demand for knowledge about information and communication technology in combination with its social and pedagogical consequences. There will also be a need for knowledge on how to structure information, evaluation skills when it comes to our own activity and science results. Information technology and Communication theory are other significant areas. This means we have to develop methods for ICT-pedagogical work and distance education."¹

I will use an example from Sandviken, Sweden, to try to answer the question above and show that the question is highly valid from both a teachers and a students perspective.

Due to the possibilities of the Internet and ICT e-learning is growing and expanding all over the world. E.g at University of Gävle, closest University to Sandviken, more than 20% of the courses and educations are given through distance education studies. But there are problems connected to e-learning;

1. E-learning demands that the students take on a great responsibility for their own learning.
2. Teachers must be willing to give away the same level of responsibility to the student.
3. This way of learning and teaching are not comparable to traditional school activity.
4. Most of the e-learning offered, all around the world, are pre-produced knowledge packages meant to be consumed by the students. There are not much, if any, space for the presumptive student to have any influence over the course or education.

Considering the above statements we can say that e-learning demands other competence's and skills both from the teachers and the students than traditional school do, as well as another perspective on what we mean with knowledge. The conclusion must be that students must have early experience of problembased or problemoriented learning and the teachers must early on give their students influence and effect on their study situation. The latter is pointed out both in the curriculum for the Basic Compulsory school as well as in the curriculum used in Upper Secondary school.²

Flexible learning in Sandviken.

In the municipal of Sandviken, a city with app. 36,000 inhabitants situated 200 km north of Stockholm, there is an ongoing project, "Flexible learning", where children aged 11-12 years are working with e-learning. Currently, April 2001, 15 different classes around Sandviken are working in similar ways and more schools are planning to start.

The project started at Arsunda Church School in October 1999, after more than one year of preparations and discussions, both on the educational and the political arena. The projectleaders arguments to carry out such a controversial project were the following;

1. Distance education are becoming very common in higher education.
2. Sandvikens Upper Secondary schools are planning, or are possibly forced to, to let students work this way during a 7-year period where the students are too many to be hosted in the present facilities.
3. To be able to maintain a high educational quality, teachers and students must get appropriate training. For the students this is absolutely vital and the earlier they get the training the better.
4. Earlier projects, both in Basic school and Upper Secondary, have shown educational advantages such as enhanced social and communicative skills, more effective learning (more knowledge with less

time in school...) and also lower drop-out rates.³ Another benefit is that the teacher on occasions get more time for children with special needs.

5. Participating must be voluntary and the children can choose to work one day a week from home preferably together with a friend from the class.
6. Parents must agree and take on the physical responsibility, which doesn't mean they have to be at home at the occasions their child is working from home.

The first application about the project were denied by the City Council in Sandviken in August 1999. However, they had nothing to say about the educational model, but objected to the financial investment involved at that moment and were doubtful concerning the age of the children.

After a few changes, exclusion of laptops among them, and arguing "that this way to learn, you have to learn" a new application were submitted to the local board of Arsunda and granted in October 1999. As all was set, all educational and technical preparations ready, the project started a few days later.

Goals and aims of the project "Flexible learning"

The following are some headlines, aims and goals mixed, from the original project application written by the projectleader/teacher Kåre Skantz;

- Encourage active information searching.
- Encourage parental involvement in their children's education.
- International perspectives. (the class are working close together with Sun Valley School in Winnipeg, Canada and Burns School in Maine, USA)
- To enhance the children's social and communicative ability.
- Improvement of children's and parents understanding of how the Internet and e-mail can be used.
- To give the girls the same opportunities to develop their capacity to use the computer as an educational tool.
- Examine how this will influence the communication between teacher/pupil, teacher/parents and parents/pupils.
- How much time, more or less than before, will the teacher put in this way of working and how will it affect his/hers tasks.
- All students involved in the project shall be able to work independently from home or from another part of the school during one day.
- All students shall learn how to use the computer programs necessary for completion of assignments, e.g. word processing, presentations, e-mailprograms, Internetbrowsers and digital picture processing.
- That the children and their parents, together, shall enter deeply into research and information seeking as well as into processing the information found.
- We're hoping parental attitudes towards school evolves in a positive and meaningful direction where they feel they have influence and insight in their children's education.

Evaluation and conclusions

The project were evaluated by Kerstin Andersson at Sandvikens Development Office and were published in October 2000.⁴ Mrs.Andersson is also a regional co-ordinator in the Swedish governments ICT-project ITiS.⁵

The evaluation were made through questionnaires to students and parents and through conversations with the children, the parents and the teachers and their principal. Beneath follows a short summary of the evaluation.

The students judgement are that this is a different and funnier, more motivating way of working and they wish more pupils would get the opportunity to try it out. They think it's important to learn how to take on such great responsibility for their own learning before they get to Upper Secondary. They think it's important to feel that teachers and parents have confidence in them handling this in a proper way. They also say that they learn better and quicker, get more tasks done and that they are well aware of the goals with the project as well as they are familiar with the goals in the curriculum.

They also state that they have satisfactory contacts with their class and their teachers, through e-mail, chat and telephone, when they work from home. Most problems that turns up during the day can be solved this way. If not, they have learnt to wait until they're back in school.

The parents experience that the children work better at home than in school. They no longer have any worries about whether the children would take responsibility and maintaining work discipline as they have seen that the children function better than they could have imagined. They say the children are making their own planning, take great responsibility, work hard and learn a lot. The parents also say their children keep in contact with each other in many different ways outside schoolhours in a manner they did not do before. Their insight about schoolwork have increased and they feel fully informed on their children's doings and progress.⁶

An important opinion, on which all parents agreed, was that they wanted to see this work being followed up and continued when their children start 7th grade at another school.

The teacher in charge says that this way of learning demands other competence's from both the student and the teacher compared to traditional learning. Other tools, techniques and strategies must be learned and handled and this takes time. It really is about changing the teachers, parents and students perception and comprehension of learning. It seems if you work without a steady timetable the structures for how-to-do the work and planning the work get more important. As the students themselves have to do a lot of this it seems they get more motivated to do the work as well. The time it takes for the teacher to help out with structures and planning varies with each individual. The structure patterns are made very open and the students are free to change them if they find another way that suits them better, but they can not change the goals of their work during the way as they are always connected to the curriculum. As all the students write logs, both on the intranet when working from home and once a week in the classroom, each child gets extra time from the teacher.

The teacher says they work problemorientated, not by the book though, and the students have a lot to say about form and substance. He says it's important to encourage independent thinking and own initiatives. This is not a special form of pedagogy, more a way to relate to learning and education. "Flexible learning" also suggests that there is a variety in methods and the choice of method depends on the students learning style.

About the logs the teacher says that he over time can see that they longer and better, but he is concerned about the content anyhow. This because he would like the students to write their logs in such a way that you actually can follow the process. The best about the project is that it enhances the children's self-esteem as well as their self-reliance and improve their social and communicative skills.

The second teacher interview is with a newly examined teacher working in the class with Science, Music and Physical training. She had heard about the project during her last year at University and was very doubtful about the idea itself. She could never dream of that she would actually have her first job in the class in question. She says it has been exciting and useful to work in this very different way but it takes a lot of planning. The planning gets harder because she doesn't know from time to time which of the students that will be present in school and this complicates the "education". She has realised the importance, in this context, to let go of the thought of traditional education if you want this to work out well. She expresses interest in developing methods for distance education concerning her own subjects.

The principal takes a positive stand towards the project, but are concerned about the costs this way of working, if widely spread, could result in. She also states that more teachers at the school are following the project with interest and that she will do what she can to let the kids go on working this way when they move to another school in Sandviken in 7th grade.

The evaluator concludes that a significance for the project are the positive attitudes teachers, students and parents mediate. The project started well-founded;

- Parents and students well informed and willing to try.
- Clear goals well known by everybody involved in the project.
- Politically allowed
- Teachers, students and parents having access to the same First Class intranet
- Project leader with solid educational experience and also long experience from using the computer as a learning tool in order to change both forms and ways of working in school
- Students, although young, experienced and competent when it comes to using computers
- Good access to computers both in school and at home

”All these conditions have surely contributed to the positive results of the project and to that the goals have been achieved”.⁷

To be continued.....

What happened next was that the class at Arsunda school got a lot of attention from media (there were a massive interest before as well) which led to a never-ending stream of classroom visitors from near and far. The result in Sandviken became that more schools and groups of students took the chance to work with a day or two of distance education. At this moment 9 different groups, among them two other groups at Arsunda school, in the 5th or 6th grade work this way and six groups at Upper Secondary school, at two different programs, do the same. Additionally three more groups are planning to start in August, but the numbers can rapidly increase.

The projectleader in Arsunda have been assigned to work two days a week ”to develop methods for ICT-pedagogical work and distance education. ”There are two aspects there are more important to look into than anything else and the first is what kind of tools, strategies, techniques and attitudes the teachers need to be able to create fruitful learning. The second aspect is the same question from a students perspective.

Another question would be what this mean in the continuing school development work. In Sandviken, as in all the Swedish municipals, we have a complementary local curriculum called ”The red thread” which is applied on the schoolsystem from pre-school to Upper Secondary school. At the moment you could say the thread consists of a lot of colours and are broken at quite many points.

I will not define the specific measures we have to take, but a genuine educational effort concerning the teachers e-learning competences, in order to enhance their comprehension of the consequences e-learning will have, pedagogically and socially, are what we have to start with.

References;

1. Editorial, Isaksson.T (1998) Datorpedagogik - 9 specialarbeten. ISBN 91-972662-1-3
2. Curriculum for the compulsory school, the pre-school class and the after school centre Lpo 94
Curriculum for the Upper Secondary School Lpf 94
3. A project carried out at Palmcrantzskolan Upper Secondary 1997/98 had a drop-out rate of 1,5% compared to more than 15% at a national level the same year.
4. Document can be found at <http://dynaweb.sandviken.se/dynaWeb/document/utv.PDF> (not available in English)
5. The Swedish Government is investing 1.7 billion SEK (US \$180 million) on a National Action Programme for ICT in Schools, ITiS. ITiS is an information and communication (ICT) project as well as a school development project. It is the most extensive investment in school development and in-service training in Sweden ever.

6. The parents meant that being on-line at the same intranet, Sandviken uses a First Class intranet server, as teachers and children were of great importance.
7. The authors translation directly quoted from the evaluation made by Mrs. Andersson.

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DISTANCE EDUCATION CENTRE AT TECHNICAL UNIVERSITY OF GDANSK – DECTUG ONLINE

Anna Grabowska, Distance Education Centre at Technical University of Gdansk

Introduction

The goal of the article is to share a good practice and to present online courses offered by DECTUG. The European dimension of the article is based on networking and co-operation with many European countries in several projects supported by the European Commission. DECTUG was established by the Rector on 30th April 1997 and with EU funds support (1998-1999, PHARE Multi-country Programme in Distance Education). Since 1999 DECTUG has been involved in four Leonardo da Vinci projects. The Centre is also involved in postgraduate studies for teachers titled “Internet and Multimedia for Need of the XXI Century”. In the article projects’ objectives, partnerships and achievements are presented.

DECTUG 1997- 1999

Distance Education Centre at Technical University of Gdansk (DECTUG) is the special unit dedicated to developing and delivery courses offered in ODL mode. It was established by the Rector of the TUG on 30th April 1997 and with EU funds support (Phare Multi-country Programme for Distance Education, 1998-1999). The main objective of the Distance Education Centre is to create access for students and staff of the TUG to study materials, correspondence lessons, scripts and communication environment using the Internet. DECTUG is also responsible for developing distance education course modules and adaptation of existing European Union distance education course modules that are suitable for local delivery. The courses that are delivered by DECTUG are mainly Internet based ones. Course materials are published on WWW, and communication between students and tutors is based on e-mail or newsgroups. The students come both from inside and outside of the University. This includes students from partner institutions and independent people willing to take part in some courses. Most of DECTUG staff consists of people that are contracted for specific tasks. They are not full time DECTUG employees. The DECTUG core staff is responsible only for management and technical support. Course preparation and tutoring is done by subject experts hired only for the duration of the given course.

From 1998 to 1999 DECTUG was involved in the following projects in PHARE Multi-country Programme in Distance Education:

- PHARE Multi-country Programme in Distance Education - Establishment and Operation of a Regional Distance Education Study Centre (1998-1999).
- PHARE Multi-country Programme in Distance Education - **ENViromental MANagement** (1998-1999).
- PHARE Multi-country Programme in Distance Education - **Energy & Environment - Distance Education Course** (1998-1999).
- PHARE Multi-country Programme in Distance Education - **WAter and WAstewater MANagement** (1998-1999).
- PHARE Multi-country Programme in Distance Education - **Learn about Open LeArning** (1998-1999).

Since 1999 until 2000 the DECTUG took part in the NEPOLD project (Network of Europeans Partners in Open Learning Delivery). In the twinning partnership with DIPOLI, Helsinki University of Technology the course “English for Environmental Awareness” was developed and delivered for the pilot group of students (7 Polish and one Italian).

The experiences gathered during PHARE Multi-country Programme in Distance Education were very useful. Nowadays several ODL courses developed under PHARE framework are offered (www.pg.gda.pl/dec). It should have been stressed that the lack of tutors is a serious constraint in

offering the course for commercial usage. Only two of them “AutoCAD for beginners” and “English for Environmental Awareness” are actually delivered.

DECTUG 1999-2001

The main Web page of DECTUG is shown in Fig.1.

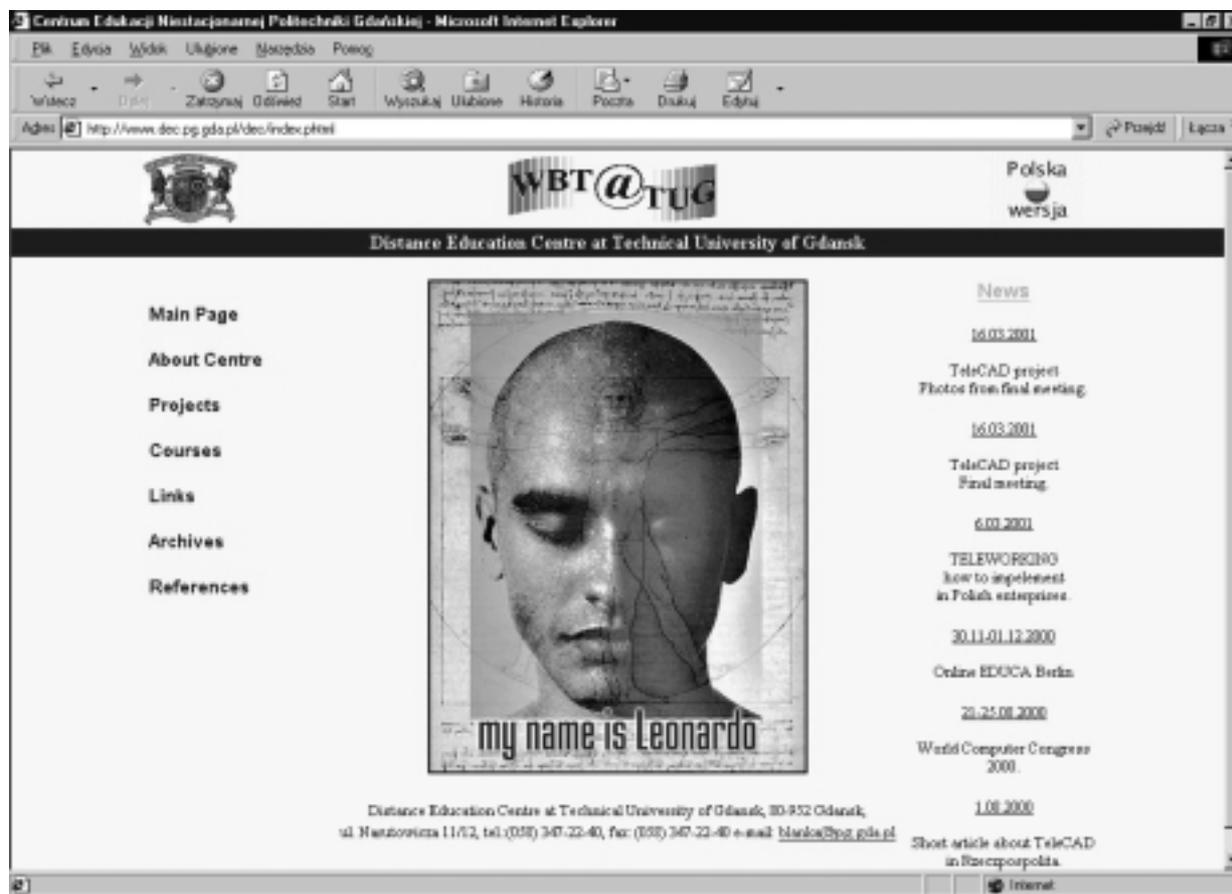


Fig.1 DECTUG welcome page

Since 1998/1999 DECTUG has been involved in four Leonardo da Vinci projects:

- TeleCAD - Teleworkers Training for CAD Systems Users (1998-2001).
- MDEC - Multimedia Distance English Courses for Polish Users in Legal, Banking and Finance, Science and Technology, and Safety Training Sectors with Elements of European Union Regulations and Standards (1998-2001).
- AYTEM - Accompanying a Young Teacher into Educational Market by Distance Course Mode (1998-2001).
- LINGUA WEB – LinguaWeb for Small and Medium Enterprises (1999-2001).

TeleCAD - Teleworkers Training for CAD Systems Users project consists of:

- developing dedicated platform in the Internet for project developers (for management purpose, exchanging ideas, developing the project contents, monitoring the results),
- developing training methodology for teleworkers working with CAD systems on a basis of experiences of partners involved in the project and results of research in this field,
- developing dedicated platform in the Internet for teleworkers,
- developing electronic-based teaching materials (CD-ROM),

- developing the special guides for tutors and learners in English and in national languages,
- delivery of example courses for teleworkers working with CAD systems for different target groups (university students in Poland, post secondary students in Italy, young workers in Finland and Greece).
- There are the following organisations involved in the project:
 - Technical University of Gdansk (TUG), Poland
 - ARGO s.r.l. Formare l'Europa, Italy
 - IDEC, Greece
 - ZEUS, Greece
 - Pekkala Software Oy, Finland
 - Young Digital Poland, Poland

Since November 2000 the TeleCAD course is offered at the URL:

http://www.dec.pg.gda.pl/dec/index.phtml?id=telecad_en

The welcome page of the pilot course is shown in Figure 2.

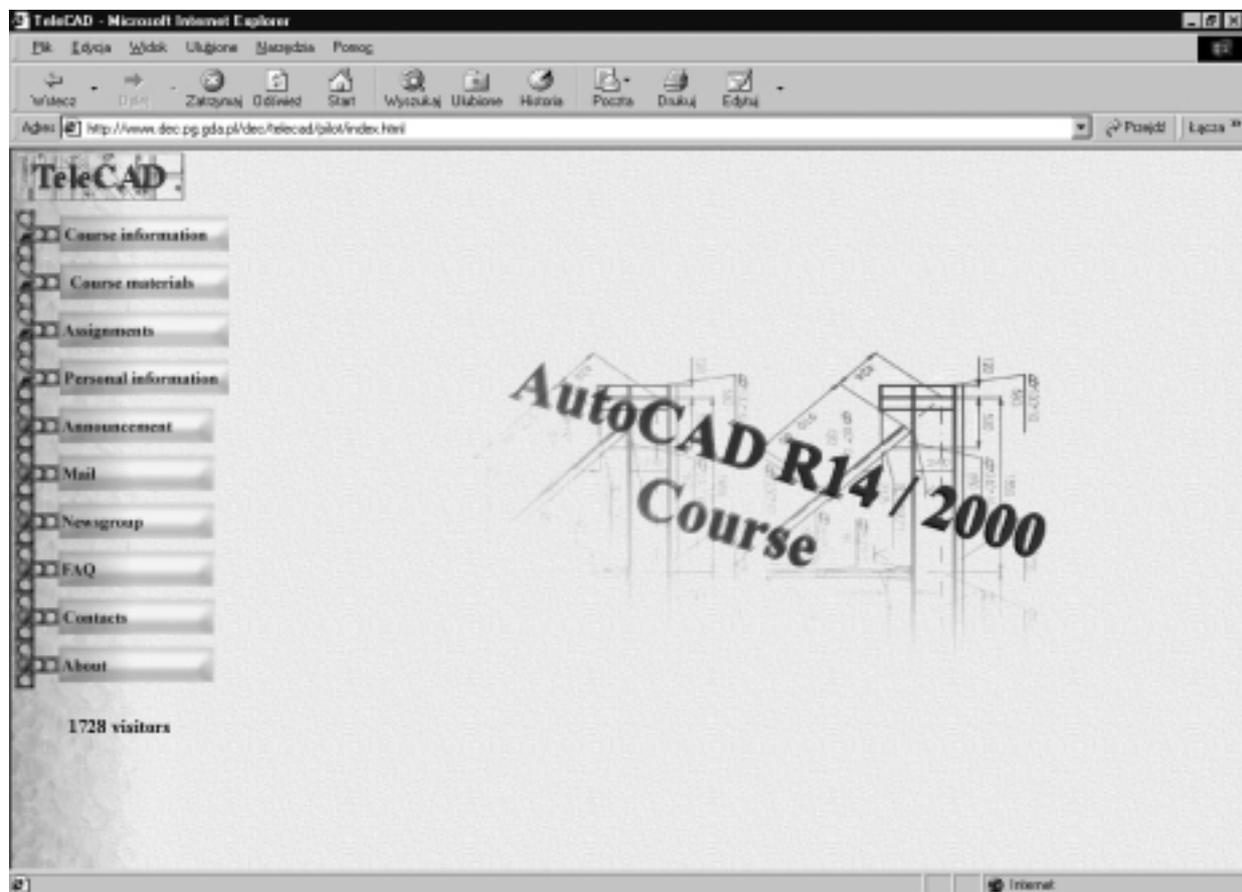


Fig.2 Welcome page of TeleCAD pilot course

MDEC - Multimedia Distance English Courses for Polish Users in Legal, Banking and Finance, Science and Technology, and Safety Training Sectors with Elements of European Union Regulations and Standards is aimed to fostering the development of methods of self-training at the workplace, and open and distance learning and training, in particular to facilitate access to continuing vocational training. The supporting activities are oriented at developing linguistic skills as part of vocational training. These courses are planned to be used for teaching students at universities, in continuing education institutions and will be disseminated into other groups of users. The project is a

combination of development of information and communication technology and providing a solution for enhancement of worker's qualification in the era of information society. The project is based on advanced ICT technology (WWW, e-mail, multimedia).

The final product of this project consists of:

- Software system for Distance Education
- Educational package for English learning

Educational package is in the form of six multimedia specialised English course modules placed in the web. The courses are following:

- General English
- Legal English
- Banking English
- Internet Technology
- Science and Technology
- Occupational Safety

The courses are designed for university students to be used in the first phase as an addition to traditional courses and in the long term included in the curriculum. DECTUG has developed a Web page for the project management purpose (URL: <http://www.dec.pg.gda.pl/mdec/>).

AYTEM - Accompanying a Young Teacher into Educational Market by Distance Course Mode project aim is to provide young and old teachers with training, allowing them to improve their methods based on new ideas and experiences of colleagues from different parts of their countries and the world. The project provides a course materials for teachers and a platform the course delivery. It also trains tutors in partner countries.

There are 10 partners organisations from 6 countries involved in the project development:

- Kaunas University of Technology - Lithuania
- Vytautas Magnus University - Lithuania
- Panevezys Regional Teachers Education Centre - Lithuania
- Mazeikiai Education Centre - Lithuania
- Ministry of Education and Science - Lithuania
- University of Oulu - Finland
- Nordic Folk Academy - Sweden
- Odense Technical College - Denmark
- Technical University of Gdansk - Poland
- Jozsef Attila University - Hungary

The educational CD ROM has been developed and Web Based Training environment Luvit is used for the course delivery.

LINGUA WEB – LinguaWeb for Small and Medium Enterprises project is aimed to foster co-operation between small and medium businesses based in different regions of Europe. This can be achieved by providing the interested companies with information about the local culture, society and language.

The project implements and validates a Lingua Web Service providing:

- Information about local/regional language variants and authentic samples.
- Authentic multimedia documents from local/regional business, society and culture-related communication contexts.
- Demonstration modules for business, society and culture-embedded language learning extensions.

The Lingua Web Service addresses the communication and language training needs of SMEs in European business contexts. In the lifetime of the project, it will be developed and evaluated as a prototype for 4 languages (English, German, Irish and Polish) involving "chamber of commerce" type institutions in Germany, Ireland and Poland.

There are the following organisations involved in the project:

- Ebehard-Karls-Universität Tübingen, Germany
- LINK Institut für Linguistik ind Interkulturelle Kommunikation, Germany
- CTS Cormorant Telematic Systems, Irland
- Distance Education Centre at Technical University Gdansk, Poland

The welcome page developed by Ebehard-Karls-Universität Tübingen is shown in Fig. 3.



Fig. 3 Welcome page of LinguaWeb project

Internet and Multimedia for Need of the XXI Century

In 1999 the project titled “Internet and Multimedia for Need of the XXI Century” was prepared by Distance Education Centre and Electronics, Telecommunication, Computer Science Faculty. The project was financed by the Ministry of Education and 30 teachers took part in the first year. The project’s experiences (first semester) were presented during Open Classroom Conference in Barcelona’2000.

During the second semester participants were given theoretical knowledge on the components of the Web-based classroom, the methodology of planning and design, content development and distribution, enabling communication, online student assessment, class management, technology recommendations. After providing by the lecturer the certain knowledge the students were expected to develop the project in groups of 2-4 people. 10 projects were developed during the second semester and students presented them in the presence of the academic staff and others.

The main stages of developing Web-based classroom projects were as following:

- defining the goal and basic tasks,
- project content development,
- project content distribution - CD ROM preparation,
- enabling communication and optionally online assessment,
- project demonstration for the public.

The example welcome page of a Web-based classroom project is shown in Fig. 4.



Fig. 4 Welcome page of the example project “Internet and Multimedia for Need of the XXI Century”

Summary

It should have been stressed that the number of international projects do not decide if the ODL centre is sustainable. The most important is the number of the courses which are not only offered but sold. In the DECTUG case “AutoCAD course for beginners”, “English for environmental awareness” and “Internet and Multimedia for Need of the XXI Century” are the best sale. What is more the TeleCAD course, developed under Leonardo da Vinci framework is also offered for regular students at TUG. Students from Civil Engineering Faculty have a choice to take part in traditional labs or in online course. In the academic year 2000/2001 30 students took part in the pilot TeleCAD course. It seems to be very realistic

that the number of online students will grow and the other faculties will pay more attention to the new technology which can be applied for education at the traditional university.

References:

1. <http://www.pg.gda.pl/dec/>
2. <http://www.dec.pg.gda.pl/~blanka/references.html>

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PROJECT FOR A DISTANCE LEARNING DEGREE IN ECONOMICS

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1. Scenario in theory

Projecting a distance learning degree has to take in account the following points:

- Shifting of focus in the training process from teaching to learning (a distance learning degree refers more to students than to teachers)
- The reconfiguring of the teacher's role that instead of delivering speeches becomes a guide to the students, i.e. from "sage on the stage" to guide on the side
- The assertion of new styles and techniques of teaching that highlight:
 1. The planning and setting of electronic material downloaded from the Internet
 2. A general interaction among colleagues, students and instructors and among students and professors
 3. Learning by doing (simulation devices and projecting and co-projecting research)
 - A very accurate balance of professor to student lessons; synchronous learning (teleconference and chats) and asynchronous (downloading of material, discussion forums and mailing lists);
 - The need to possess an accurate evaluation knowledge that accompanies the entire process (needs analysis), monitoring finalised at a new project in itinere and, finally the evaluation of the efficacy and efficiency in the interval of the learning process
 - At this point the role of the tutor becomes more and more important. Not mere aid to the teacher, but key figure during the whole learning process both in the didactic team and with students;
 - No more distinction between on or off campus students.

Quoting, Turoff¹, in such a perspective, "students will become intelligent consumers capable of determining the adequate combination of electronic courses and in presence ones".

2. The DECUS model for Distance Training (DT)

From a technological point of view, our university is equipped to take into account all the above. The result has been the DECUS system. The acronym (Distance Education Catholic University System) refers to the possibility of providing training programmes from one of our campuses to all the others, as we will see mentioning the territorial organisation of the Catholic University (UC). Yet, in view of the what has been said above, the D could stand for Distributed Education, that is a training process in which the variable space is annulled in favour of an accessibility everywhere for everyone.

The inverted commas are obligatory in view of the fact that concepts such as real presence, telepresence and on line presence are integrated moments of the same training process.

This paper is the result of a common study with colleagues from CEPaD (University Centre for continuing education and distance learning) such as: Prof. Giorgio Bocca, Dr. Simona Ferrari, Dr. Fortunato Pigni, and Dr. Flavia Scott.

¹Turoff M. (1997), *Alternative futures for distance learning: The force and the darkside*, UNESCO – Open University International Colloquium, April 27-29. In Internet, URL: <http://eies.njit.edu/~turoff/Papers/darkaln.html>.

To gain a more complete understanding of the nature of DECUS, we must consider two types of descriptors:

- organisational
- technological

2.1 The organisational structure: a network-university

Structure: UC is a network-university based in four sites (Milan, Rome, Brescia and Piacenza), two detached campuses (in Cremona and Campobasso) and 13 cultural centres.

There are about 40.000 students enrolled, with 2.500 professors and 4.700 office staff.

This organisational structure provides two indications for the didactic projecting:

- the real opportunity of integrating distribution and training. Work on peripheral locations, thus enabling the students to attend both virtual courses and in presentia courses and not only distance courses in a virtual campus (as it now happens in Barcellona or at the Politecnico di Milano). In this respect the UC is close to the structure that can be found at UNED in Madrid, even if our university is already oriented towards a training scenario in its third generation. In this way the UC can rely on all the possible didactic scenarios: a student in Ragusa (or Verona or even Taranto) may attend all the lessons in videostreaming from the nearest cultural centre, in this site he meets his tutor and can also attend in presentia lessons from home downloading all the useful material, entering the chat forums and interacting via email with the teacher;
- the pedagogic relevance of this conduct line is to maintain (or even develop) the personalistic approach, centred on the relation and on the educational conduction that is part of the tradition of UC avoiding all the risks linked to a “hard” on line training: reconfiguring of the training in the sense of selfeducation, loss of subjectivity or isolation of the actors.

The aim in fact, is not only to allow the students to connect to his University from home, but to bring the whole structure in his home.

2.2 The technological structure: an integrated didactic model

This structure has three technological devices:

on line presence with the teacher (personal homepage, general info on the course, bibliography for the exams, bulletin board) on the Web site of the university (in the short run, every teacher at UC will have this facility available, independently of the technological level of their didactics);

- Live tele-didactics, managed on Net_Stream platform that monitors a communication satellite network that interactively links all the above mentioned sites that include virtual classrooms;
- Web-based didactics managed by the courseware Blackboard. A courseware which has been adopted after an accurate evaluation research. In effect, Bb will become a connective tissue for UC as far as on line didactics is concerned. Bb will formally assist CEPaD in a personalisation project of the platform which will allow to calibrate and optimise the needs within UC.

The above mentioned technological devices – which are not self exclusive, but are part of a systemic whole related to a professor-to-student didactics – they represent the supporting frame of the didactic model in UC, an integrated model that plays on three linkable scenarios adaptable to the features of the individual training offer:

- Live didactics in presentia (developed by an on line presence and assisted by multimedia features: multimedia labs, hypertextual presentations, etc.)
- Live and non-live teledidactics.

Live: interaction in real time with the students from the remote site

Non-live: use of a palimpsest which becomes reference for all the students

This scenario is not only adaptable to degrees offered within UC but also at an even higher level such as:

- masters courses
- continuing education department (up dating courses, specialisation courses FSE, IFTS and so on) dragging force and qualifying element within UC in the high training section.

3. The role of CEP@D and the actors involved

The role of CEP@D , within this scenario is the answer to the double nature of its institutional mission: the technological one i.e to implement solutions for the didactics within the University and the research one i.e. to experiment and provide didactic and functional models in the use of technological devices.

This paper though refers to the planning of a distance degree course in economics (provided by the Milan site towards Rome and another two cultural centres such as Verona and Ragusa) – this role involves a triple effort: planning, training and co-ordinating of the actors (teachers and the staff at CEP@D) . The chart here below lists the people involved in this project fixing their duties and foreseeing the amount of time necessary for the training needs.

Professional figures	Duties	Time	Training Needs
Didactic Staff			
Professor	<ul style="list-style-type: none"> • provides the contents of the course; • indicates the passages to read • decides the topic and the forum matters; • takes part in the forums on disciplinary matters • manages the learning process in the virtual classroom. 		<ul style="list-style-type: none"> • presentation of the two platforms; • presentation of the possible didactic paths • material editing
Instructor	<ul style="list-style-type: none"> • manages the users of the course typing in the names and/or erasing them defining the roles • up dates the schedule of the tasks • up dates the material; • sets the FAQ list on the contents of the course; • sets individual didactic paths; • opens and closes forum lines interacting on disciplinary matters; • manages the learning process ; • marks the tests giving a feed back to each student. 		<ul style="list-style-type: none"> • presentation of the two platforms; • presentation of the possible didactic paths • editing of the material – training on BB platform; • training on Net_Stream platform; • management of the communication tools; • material editing.
Remote classroom tutor	<ul style="list-style-type: none"> • guarantees the institutional bond with the University; • monitors the classroom and leads the speeches among students; • studies the relational dynamics; • writes reports for the monitoring evaluation; • guarantees a feedback on the success of his communication skills; 		<ul style="list-style-type: none"> • presentation of the two platforms; • description of the didactic use; • training on Net_Stream platform; • training on tutoring techniques.

Professional figures	Duties	Time	Training Needs
Net Tutor	<p><i>Learning support:</i></p> <ul style="list-style-type: none"> • points out, trains and co-ordinates all the students or chiefs for peer tutoring; • helps in the use of the tools available • deals with the FAQ list and organises the possible answers; • deals with the specific FAQ list on the contents of the course; • gathers and organises the students' materials; • deals with the records of the course; provides a compendium on the activities as for instance the reports on the forums; • sets the timing for the co-operation activities <p><i>Communication support:</i></p> <ul style="list-style-type: none"> • sets and supervises the netiquette of the course • monitors and stimulates the participation at forums and at the virtual classroom; • studies the relational dynamics; • builds dedicated mailing lists; • sends support messages and constant feedbacks <p><i>Monitoring</i></p> <ul style="list-style-type: none"> • writes periodic reports to the teacher • follows the students' learning path 		<ul style="list-style-type: none"> • presentation of the two platforms; • presentation of possible didactic facilities; • training on tutoring techniques (in presentia and on the web). • training on Blackboard platform, • management of the communication tools.
Technological Staff			
System Administrator	<ul style="list-style-type: none"> • checks the technical functioning of the server and of the platform. 		
Chief technician for telecommunication	<ul style="list-style-type: none"> • manages the Net_stream platform • deals with the multimedia aspects linked to the technical transmission ; • supervises and manages the performances of the terrestrial and satellite network. 		
Course manager Bb	<ul style="list-style-type: none"> • plans with a staff of teachers and an educational designer the course on BB; • deals with the training and technological needs; • guarantees the help-desk service on the platform on the didactic issues; • examines the statistical data on the accesses; • manages the training of the didactic staff on the platform. 		

Professional figures	Duties	Time	Training Needs
Project and managing			
Project leader	<ul style="list-style-type: none"> • is responsible of the project • manages the equipes involved; • supervises the process in his phases (times, realization). 		
Educational designer	<ul style="list-style-type: none"> • manages the training of tutors and on line tutors and of instructors; • writes and updates the process storyboard, according to project leader; • manages on line and remote class-room tutors; • evaluates and manages the relationships with some external evaluators, according to the teacher. 		

Training needs we've quoted into right column of the chart could be satisfied through the first formation plan into the next chart (CEPaD will grant, otherwise, a technical and didactical help-desk during all over the process).

Units	Class hours	Teachers	Instructors	Tutors	On line Tutors
1. Platforms presentation	4	X	X	X	X
2. Didactics	4	X	X	X	X
3. Bb training	4		X		X
4. Net_Stream training	4		X	X	
5. Training for tutors	10			X	X
6. Training for on line tutors	10				X
7. Communication devices	10		X		X
8. Editing	4	X	X		

4. Didactical architecture and process storyboard

All the elements we've already mentioned, the didactical model we've proposed and the distribution of roles and functions described can finally be organized:

- into a didactical way, in which it is possible to realize some concrete scenarios of the work that didactical equipes must do;
- into a process storyboard that allows to visualize the steps of didactical and technological project and implementation, pointing out roles, actions and time to respect.

4.1. Didactical architecture

Let now we synthesize elements we've already found and make order among them; so it will be possible to define more precisely the formative structure of the degree in Economics.

It consists:

- in giving five base-courses of the first year (Business economy, Politics economy, Mathematics, Psychology of communication, Law),
- to a presence class-room (in Milan)
- and to some remote class-rooms (in Rome, verona and Ragusa).

From the didactical point of view:

- the teacher gives lessons² into the class-room in Milan, and by Net_Stream he'll be sent to the remote class-rooms. The interaction with the students will be possible with whom is present in Milan (on campus) and also with whom is teleconnected form the peripheral sites (off campus). The lessons, through Net_Stream platform, can be supported with video data (slides, Ppt presentations) and with a real time chat;
- the teacher, aided by his instructors, will give his course in Bb. Here he'll be able: to charge lessons schemes, papers, other materials; to use virtual class-room services; to leed workshops and make tests.

It's clear that on line education is the same for on and off campus students; only difference, the tupology of the presence: physical for on campus students, virtual for on campus ones. The intercation with the teacher, in fact, makes this difference not remarkable at all.

At the end of the first year it will be possible to think to the editing of the materials (units, videos, lessons clips), more precisily:

- to prepare didactical instruments for the next year;
- to build a virtual library for the students;
- to produce educational kits market oriented.

4.2. Process storyboard

Here, finally, by chart, the steps for whole process implementation.

² Every lesson will be structured so it can have such an articultaion: 1) focusing the theme and first set of teacher's communication (10'); 2) feed-back from the class-rooms (10'); 3) second set of teacher's communication; 4) feed-back from the class-rooms (10'); 5) conclusions of the teacher and assignements for the next lesson.

Chart 2 – Process Storyboard for development and implementation of the degree

ACTIVITIES	OUTPUT	ROLES INVOLVED	MONTH	TIMES
CONCEPT (BLACKBOARD + NETSTREAM) - presentation/ negotiation/ integration of the project - didactical model - timetable - presentation figures and roles involved - presentation first formation plan	Time table general activities Time table formative meetings Time table meeting about single courses	Project leader Course manager Bb Educational designer 5 teachers	April/may 2001	8 ore (due riunioni di mezza giornata)
FORMATION Units building		Project leader, Course manager Bb, Educational designer	Aprile/may 2001	64
FORMATION Tutors selection		Project leader, Educational Designer	May 2001	20
FORMATION Platforms presentation		Teachers Instructors course manager Bb and Netstream	Giune 2001	4
FORMATION Didactical use Materilas editing		teachers Instructors Project leader Educational designer	Giune 2001	8
FORMATION Training Blackboard + Netstream Training tutoring Managing interactive instruments		Instructors course manager Bb Netstream Tutors and on line tutors	Giune /July 2001	8 24 10
BLACKBOARD DEVELOPMENT - definition of corse functions - definition of the graphics - definition of the formats - activities planning for each activity	Accordino with courses specificity: - contents project - collaborative activities project - activities planning	course manager Bb Educational designer Teachers Instructors	July /september 2001	4

ACTIVITIES	OUTPUT	ROLES INVOLVED	MONTH	TIMES
BLACKBOARD TETSING - simulation about collaboration modules - revision of activities planning - revision of the materials about informative modules	Time table of activities	course manager Bb Educational designer System administrator Teacher Instructor On line tutor	September 2001	16
NETSTREAM DEVELOPMENT - time table definition - definition of the formats of the materials		Teacher Instructor Educational designer Chief technician	September 2001	4
NETSTREAM TESTING - technical test with interaction		Teacher Tutor Chief technician	Settembre 2001	4
BLACKBOARD IMPLEMENTATION - insert user IDs - platform presentation to the students - implementation materials and collaborative activities		Coursemanager Bb Educational designer System administrator Teacher Instructor On line tutor	Nov / July 2002 I week of Nov. II week of Nov.	8
BLACKBOARD TESTING - platform testing with real audiences		System administrator	Novembre 2001	
NETSTREAM IMPLEMENTATION		Teacher Educational designer Chief technician Tutor	November/may 2002	
MONITORING (BLACKBOARD + NETSTREAM) Evaluation project about courses		Educational designer On line tutor Tutor	November/may 2001	

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NET-BASED LEARNING – A DISTANCE COURSE IN TECHNICAL INTEGRATION OF DIFFERENT PROGRAMMES FOR TEACHING AND ADMINISTRATION

Rigmor Sterner, CDL, Luleå University of Technology

The EU project Mediasite is aiming at an integration of an amount of different commercial products for net-based learning and administration. It stands for virtual communities, net-based learning and product engineering. It will deploy a platform for course design and creation, and deploy a server platform for delivery of distant training to the individual student. The integration of the distant training application will also be based on the video on demand with multicast facilities to enlarge the capabilities of the application. It will also give support to the customer when it comes to the payment mechanisms for training material, for registration and delivering of course ware. Thus the platform will be a useful tool for educationalists, administrators and SMEs.

There are project partners from Finland, Sweden, Germany, France, Italy and Spain. The technical coordinator is placed in Sweden at Frontec. Digital sites are to be found in Italy (Trento and Venice), France (Nancy), Germany (Baden-Württemberg/Karlsruhe), Finland (Kemi and Tornio), Sweden (Luleå and Gothenburg) and Spain (Barcelona).

Within the project a production of a model course is included on how to use the Mediasite platform. This includes testing and evaluation.

CDT (Centre for Distance Spanning Technology) at Luleå University of Technology has asked its collaborative partner to fulfil the demand on producing, pursuing and evaluating a model course on remote access to on-line and interactive courses. Thus CDL (Centre for Distance Spanning Learning) has entered the part of the project called WP5 (Work Package 5).

CDL is working with net-based learning, research and development projects on new technology. Its scope is to develop solutions for individually applied learning, learning profiles and learning styles in order to promote lifelong learning for the individual.

The model course

The aims of WP5 are to create a net-based course for teachers, educationalists and others responsible for education when using the integrated programmes. The participants will then have useful tools to create their own study courses with the help of the programmes of the platform. They will find solutions out of the presented options for their own teaching and course content and administration.

The target group of the first testing course is educationalists and teachers. In this test-pilot course, there will be a small group of only 7-8 people. In the pilot course, which will run during the autumn of 2001 and in English, there will be people from the partner countries. Then the target group will be extended to comprehend others interested in learning how the platform could be of value for their work.

The outline of the course is drawn as follows. The course will be created according to the methodology of distance education, when a specific study guide is produced containing information, a simulated dialogue with the student, exercises and explanations. The courseware will mainly consist of manuals. The interaction, such as discussions and feedback, will be performed via an Internet based videoconference programme, which is a synchronous system, but could also be used a-synchronously. This part of the course is one of the most important parts of the training. As the integration of the programmes is aiming at using multicast facilities, the participants should be promoted to use the meeting facilities as often as possible, both with unicast (one to one connections) and multicast. Moreover, there are products, which have a-synchronous meeting possibilities, which of course are also very useful.

Contents and design

The contents of the course will be information and study of the selected software, with hands-on and theory. There are instructors for each programme who will also serve as technical back-ups of the programmes. The participants will have thematic work on the programmes. They will individually decide about the contents out of their own experience and needs.

They will start by a multicast connection where the instructor and the students meet, introduce each other and are given the first instructions on the software. Next step is self-studies with instructions and guiding via the study-guide and the teachers/instructors on-line and off-line. The students will meet via the video on demand in small groups, multicast, or unicast. They will also have opportunities to discuss via other communication facilities. There will be “summing-up-heats” where all the students meet with the teachers/instructors for further discussions and presentations. At the end of the course the students have worked out a profile for their own teaching environment and their own courses, which will be discussed at a finishing seminar.

The aims of the activity

The participants will find out how the technique and the programmes work in different situations, such as meetings, teamwork, and other teaching situations.

They will also find out how big portion teachers and students could take during a session, and how these sessions could be performed. They will learn how the methodology could be presented according to the course objectives and contents, and concerning the possibilities and learning environment of their own students. Lastly they will find out how the study material, registration and other administrative solutions could be realised and distributed.

Timetable

The test-pilot course will start end of March 2001 and finish June 2001. The pilot-course will start end of August 2001 and finish end November 2001.

Course time

Estimated course time is 40 hrs incl. instruction, guiding and meetings, both multicast and unicast. The student might use about 4 hrs for private studies per week.

Evaluation

Evaluation will be made on the programmes and their adaptability to teaching and learning. The students will be asked to keep a diary particularly on how the integration and technique works, how the programmes work, as well as how and when the software could be of the best value for them. The evaluation will also show how sessions must be performed via the programmes and how the methodology could be presented as well as how administrative solutions could be realised.

Summary

The Mediasite model course on the integrated platform will show how distance courses and teacher's training on technology and distance methodology could be realised. In the same time the project will produce a new and easy way of working with several products from the same platform in teaching and learning, and also in distribution, document handling, net-working and even buying and selling. The product providers, Marratech Pro, Frontec and Telia from Sweden and ICL from Finland, will be introduced on the market with a new product, which will serve individuals, SMEs, universities and other educational providers.

The pedagogical and methodological aspects with the course lie in the practical work with the programmes as well as finding out how and when the platform could be of the best value for own teaching, course developing and administrative solutions such as registering, delivering, billing and document handling.

Each programme already works on the market, but what the project wants is to combine these products under one roof in order to create an easy use for the end user. There is a hope that the products will be so nicely integrated that the users won't notice when they go in and out of the programmes. There is a hope that the platform will really work as a virtual community with net-based learning and for product engineering, as the sub-title of the project is Net Services for Virtual Communities.

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MEETING THE CHALLENGE

Peter Goodacre, The College of Estate Management

1. Introduction

The organisation for which I work has provided distance learning for over 100 years. Founded as a commercial business which taught for the examinations of professional institutions connected with land, property and construction, it was established as a College under Royal Patronage in 1922.

- Developments in the period leading to 1939 included the provision of full-time education which led to the degrees of the University of London. During the 1939-45 war correspondence courses were provided, amongst others, to prisoners of war. After the war there was a greater focus on full-time tuition but numerically the correspondence students outnumbered the full-time students by 20 to 1.
- Financial and locational pressures led to the College moving from London to Reading in 1973. At the time of the move the full-time courses became assimilated with the University of Reading. The correspondence courses were regarded very much as the “Cinderella” of teaching. However, the advent of the Open University in the United Kingdom set new standards for distance teaching as, amongst other issues, the new technology of broadcasting developed.
- In the early 1980’s distance learning in the specialist fields of land, property and construction became more readily recognised as a route for achieving professional qualifications. It was clear that “earning whilst learning” was, at the very least, an alternative which enabled late starters in the academic world to recover lost ground. Distance learning providers learnt to match the procedural and quality processes of the better universities. By the end of the 1980’s the academic standards attained by successful distance taught students were equal to those of full-time students. Furthermore, many employers recognised that a student who could manage work and family and study at the same time, had personal and organisational skills of a high order and were very attractive as employees.
- It was in the 1990’s that distance learning programmes became well established internationally. At the College of Estate Management we have focused only on distance learning students. Therefore the students were never treated as “second class” in the sense that full-time students and their lectures took priority. We only had this group to teach and, since they, or their employers, were paying the tuition fees, they expected to be treated like customers and we had to meet their expectations. There were major differences, however, in the relationship between students and the College, compared with a normal customer/supplier relationship. First, we are selective in our admission policy, such that we only admit people to our courses whom we felt were academically capable. Many applicants are refused admission on the grounds that their academic standing is inadequate. Second, having taken fees from students and demanded much from them in the way of study time, assignment completion and attendance at face to face teaching, we either passed them - no repeat business there - or failed them, and in so doing, certainly disappointed, or even possibly humiliated, them.
- Nevertheless our reputation continues to grow. Not so much numerically, for we have only some 2,000 “full-course equivalent students” with a total number of students registered in the region of 2,500. But geographically our spread of influence continues with students in 74 countries and in technical content we have no equal. We have benefited from Britain’s colonial past and the use of English as an international language. However, our growth in China, principally in the last decade has as much to do with the international credibility of the professional institutions for which we teach and the drive of my colleagues to market courses abroad.

2. The next generation

What will be our plan for the next 10 years? In the last 5 years there have been major advances in information technology and our own plans are based on the next 5 years. Beyond that period it could be unwise to predict too confidently. This paper simply outlines the key issues we will have to address.

Population increase

It will not be possible to meet the expectations of the world's growing population by conventional classroom teaching. This will become a luxury for a privileged minority. It is becoming increasingly difficult to recruit skilled staff who are capable or prepared to teach. The only way to achieve course delivery in an economic way is by distance learning.

Quality of teaching

The Open University and others have shown how it is possible to develop first rate teaching programmes by combining visual, textual and audio material. Self test questions can also be built into the texts so that the assimilation of knowledge is monitored regularly and not by a pass or fail at the end of an academic term.

Ability to carry out research

It is interesting to observe in modern libraries that students seem to cluster more around computer terminals than browsing through books. They are not only writing essays but accessing information of a sort which was historically the privilege of those with access to libraries. Distance learning organisations can provide, through their websites, access to an almost limitless research information base.

Structured learning

The major problem that all students have is not accessibility to data but the problem of marshalling it into a logical framework. Distance learning is particularly suited to providing a clear and structured way for students to meet their needs. It is perhaps a reflection of the College's subject area, with its technical bias, that we can be confident that our learning structures will meet students' needs. Such an approach may be less applicable to those studying the humanities.

Access to tutorial support

Our students are located in every continent. In spite of their distance from the College they can contact us with queries using email in a manner as easily as students on campus. There is "no hiding place" for tutors as our policy is for emails to be answered promptly and in a precise manner by return. We have found out that students need to think through their questions and frame them properly so they can be answered. The answers are then put on the website of frequently asked questions.

3. What of the future?

Some conventional academic institutions believe that distance learning is a way to achieve economies and/or make money. They do not understand the problem.

- Delivering distance learning requires an academic and administrative team wholly committed to that form of delivery. It cannot be a "side show" attached to a bigger show of research and full-time tuition. The staff need to treat students as customers, work in a conventional business manner, keep their technical skills up-to-date and develop their IT and teaching skills.
- Distance learning needs marketing on an international scale. However, it is very easy to lose a reputation by delivering a poor quality product and, for the College of Estate Management, we simply cannot afford to debase the coinage. At times maintaining academic standards might cost us market share but not only is it a price worth paying, it is the only policy for long-term survival.
- Distance learning needs finance. We could not continue as we do without the track record, and income, from a business of some 100 years establishment. We also need the income from the capital reserves built up by our predecessors.

4. Conclusions

Learning without limits is an exciting title for this 10th Anniversary Conference. Indeed, the need to teach by distance learning and the opportunities afforded by modern technology means that there are no longer any physical reasons why teaching is limited. Satellite broadcasting has effectively annulled the power of governments to control what is seen or heard.

- But there are limits of a different kind. Distance learning requires a commitment to standards and a commitment to financial support. I say to those here that if your heart is not in distance learning, then forget the whole idea. For it is not an easy way of teaching. It requires long-term planning, an ability to identify future students' needs and an obligation once one has started teaching a course of study to finish it. And that could well be in 10 years' time from now.

HISTORY OF DENNIS GABOR COLLEGE FOR INFORMATION TECHNOLOGY

Dr. Sarolta Zárda, Dennis Gabor College

Introduction

In September there will be the 10th opening ceremony of Dennis Gabor College in Budapest. It was a very cloddy route to arrive to the current days:

- the creation of a private higher education institute as a pioneer in the early 90s
- to be the first to introduce the distance education technology in big scale in an undefined legal environment in Hungary.

In my lecture, I would like to overview the four phases of our development: creation, expansion, estabilishment, and the transfer towards the “fifth” generation.

The launch of the College

Dennis Gabor College was established by its founders (LSI Learning Centre for Culture of Application of Microelectronics Foundation and SZAMALK Co. Training and Consulting Centre) in 1992 in the spirit of openness and equal opportunities. The College is the newest institution of technical higher education in Hungary, it operates as a private college accredited by the Hungarian state.

The College was supported by the founders in the aspects of teaching materials, curricula, high professional staff and infrastructure.

Everybody, regardless of age, place or strict admission requirements, should have access to information technology. Whereas illiteracy for people in the 20th century meant the inability to read and write, that of the 21st century is the lack of ability to gain and process information. Our aim is to ward off this new type of illiteracy. We have established a most flexible framework for higher studies which provides an opportunity to learn while meeting work and family demands. The learning process is greatly supported by mixed media (course-books, audio and video cassettes, electronic teaching materials, PC and network programmes, consultation, lab workshops, tutorials).

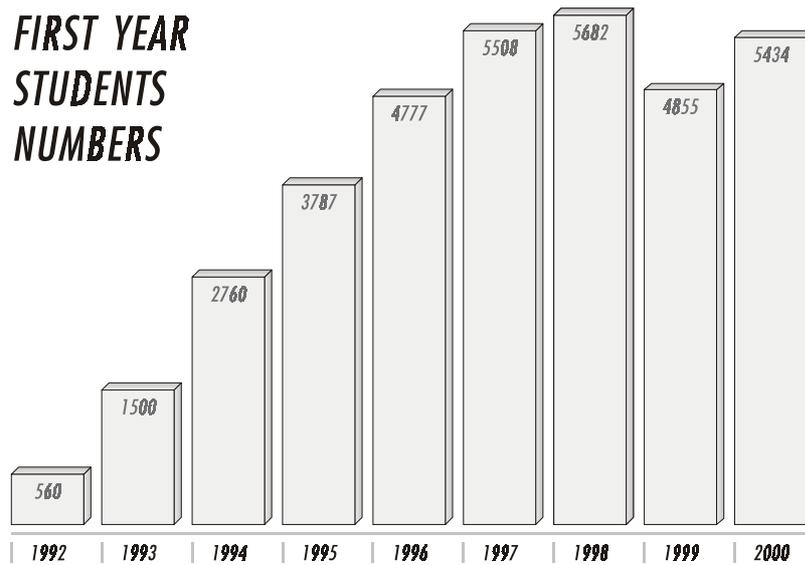
The College is within reach for the entire Hungarian population in the neighbouring countries as well.

This year we are celebrating the enrolment of our 30,000th student and 3000th graduate.

The College in Figures

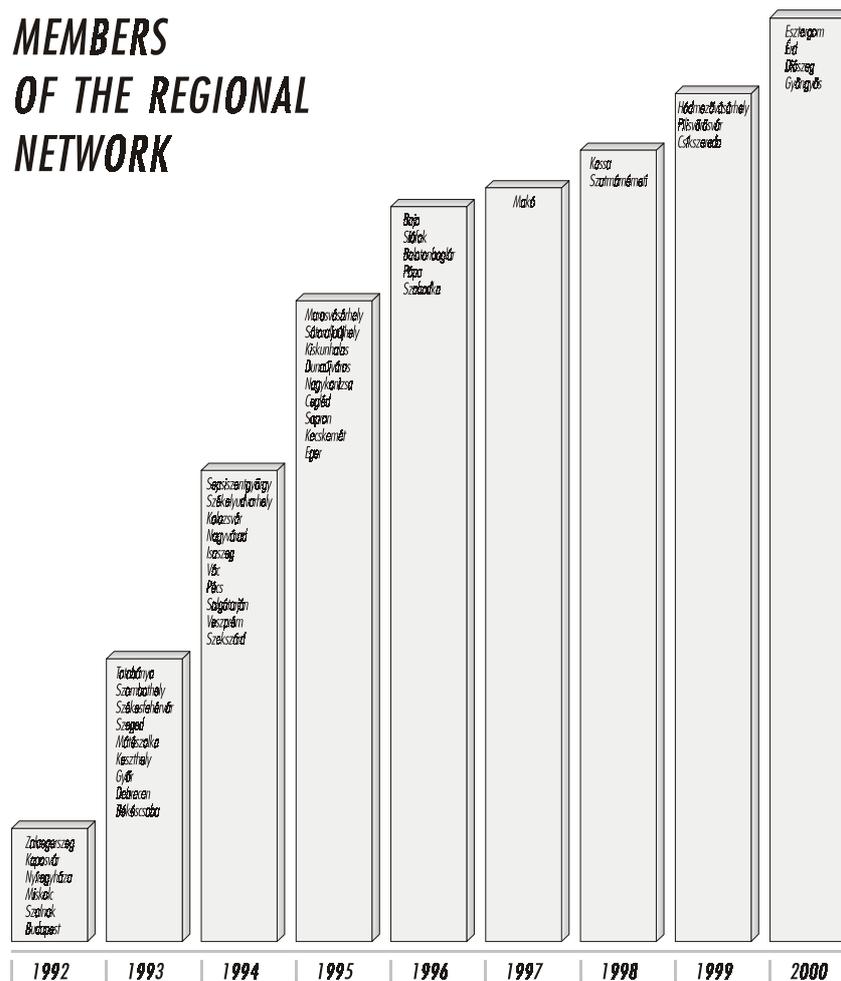
The number of students at our College has been constantly increasing since 1992. Up to 20,000 students study in Budapest and at 35 regional consulting centres all through the country, as well as in 10 towns abroad in regions inhabited by Hungarian-speaking people.

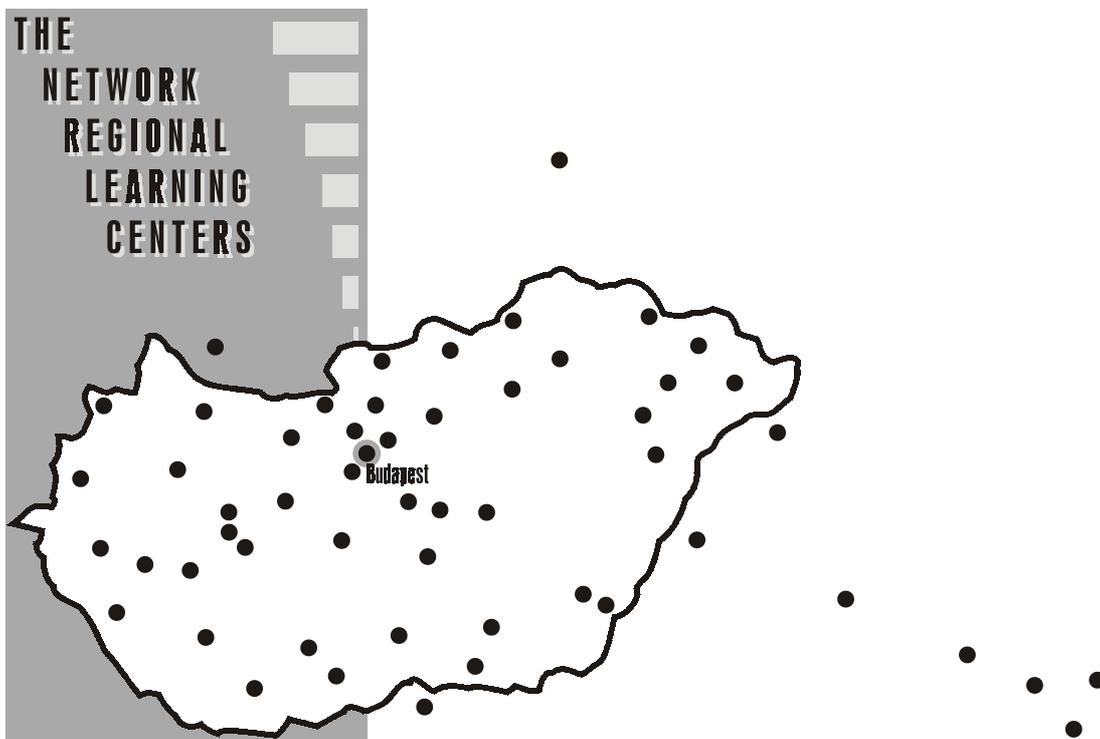
FIRST YEAR STUDENTS NUMBERS



Our college is open to all who wish to learn. Borders are becoming virtual as we deliver the opportunity to study to the doors of thousands of Hungarian speakers.

MEMBERS OF THE REGIONAL NETWORK





The number of academic and administrative staff also has been constantly growing.

The table below shows the development of the full- time staff of the College:

Year	1992	1993	1994	1995	1996	1997	1998	1999
Number of staff	130	160	250	310	440	460	490	500
Total number of employees	130	160	250	310	440	460	490	500
Teachers *	60	90	180	230	350	360	360	370
Teachers with title (PhD)	5	6	8	8	10	12	20	32

* Equivalent: full-time employee = 1, part-time employee = 0,5,

Outside teachers on the basis of average number of teachers' hours = 0,2

The target group and the curricula

We train experts who want to acquire the most up-to-date knowledge today and in the future i.e. information technology, and experts who want to work in the field of the application of information technology. We are primarily involved in basic education in two faculties: Information Technology and IT for Economics with the following graduate specialisations: General Information Technology, IT Management, Quality Assurance and Security Assurance.

The content matter and curricula of our training scheme are defined in compliance with the government statutes on the training requirements of technical academic studies.

On the fundamental education faculties, after science, social, economic, classical and information technological subjects students gain professional knowledge in accordance with their chosen specialisation.

In the Information Technology faculty students get a thorough education in the most up-to-date means of information technology as well as several fields of IT application. In this faculty students choose a specialisation from the fifth semester. The specialisation areas are the following:

IT Application specialisation

In this specialisation course students can gain further knowledge necessary for IT application concerning basically software, application systems and languages.

IT Management specialisation

Students choosing this specialisation can broaden their IT mastery with knowledge on management, they can become "IT managers" i.e. managers who will be able to perform managerial, organisational or entrepreneurial tasks in the field of IT.

Security Organisation specialisation

In this specialisation we train experts who will be able to solve security problems of IT systems on the one hand, and to utilise their acquired IT knowledge in performing general security tasks on the other hand.

Multimedia specialisation

In this specialisation students can acquire knowledge necessary to work in the more and more expanding and popular fields of multimedia and computer graphics (e.g. computer design, graphics for advertising, interactive education programmes, electronic trade, animated film-making, etc.).

In the faculty of Information Technology for Economics, after fundamental professional subjects students acquire practical skills in accounting, finance and application of IT in various fields of economy.

To review our target group, let us see the results of the survey about the incoming students in the year 2000. (The survey was done among 5000 student.)

Average age	25,56 years
Male	70,33 %
Female	29,67 %
Year of high-school graduation	
-80	5,18 %
81-90	20,12 %
94-98	74,70 %
Applied to state college/university this year or in the previous years	38,31 %
Never applied to state college/university	61,69 %
Attended to a college/university	14,02 %
Did not attend to a college/university	85,98 %
Has distance learning experience	11,48 %
Does not have distance learning experience	88,52 %
Has high-level IT knowledge	6,81 %
Has medium-level IT knowledge	29,27 %
Has basic IT knowledge	51,52 %
Does not have IT knowledge	12,40 %
Holds a foreign language certificate	17,99 %
Does not hold a foreign language certificate	82,01 %

Works full time	66,77 %
Works part time	3,56 %
Works occasionally	3,96 %
Does not work	25,71 %
Has a possibility of IT practice at home	78,05 %
Has a possibility of IT practice at work	40,14 %
Does not have a possibility of IT practice	10,16 %
Has Internet access	44,21 %
Does not have Internet access	55,79 %
Possesses a television	97,56 %
Possesses a cassette-player	82,01 %
Possesses a VCR	87,09 %
Possesses a CD-player	82,62 %
The studies are financed by the student	53,86 %
The studies are financed by the parents	33,43 %
The studies are financed by the employer	20,83 %

How do we do ODL in our College?

The scheme is open in many ways. There is no entrance exam. Anybody who graduates from secondary school is admitted. In this way, our prospective students' abilities to become experts in information technology are not decided in a short entrance test. This does not mean that the requirements are consequently not strict enough, neither does it mean that we guarantee them a college degree. What it means is that the students can decide themselves how much time they want to spend on their studies to become experts in information technology.

It is open in the sense that the students are not compelled to take all their exams during the semester but can take up the semester term with "open" semesters not ignoring the pre-requisites, though. (Thus, our College already took the first steps toward the credit system in 1992!). There are no exam periods; the students are actually free to register for exams at any given time.

The exams of the subjects can be repeated as many times as needed.

Another open element of the scheme is that the student in the distance learning section is given a free hand to decide within how many years to complete his/her studies. Basically, the scheme lasts 7 or 8 semesters depending on the faculty, but the student is entitled to ask for a year's postponement. Altogether, double that time is at students' disposal to graduate, including exam deferments, final project and final exams (over that period, certain exams may have to be retaken).

The majority of our students are trained using a combination of distance education and regular education. This means that home study plays a significant role, which is aided by the following:

1. The student is supplied with a study pack for each subject, which comprises course books, thesaurus of paradigms and study-aids, subject guide and information pack.
2. Lectures are recorded on videotapes, which enables the students to make up for missed lectures and to watch them several times if necessary.
3. Other electronic supplementary materials can be found on the Internet (e.g. dictionaries, thesaurus etc.).
4. An important feature of our distance education is the so-called tutorial system. First a mentor and, in the 5th semester, a tutor is assigned to each student. The tutor's task is to assist the student in taking his/her deferred exams, writing the final project and preparing for the final exam.
5. We have a regional network: 35 national and 10 foreign consulting centres accomplish the tasks related to distance education.

Due to the regional structure of the College, we pay extra attention to the standardisation of the content matter of the educational scheme. This is done through teachers' conferences organised for each subject by the course leaders each term or sometimes even more often. Another way to guarantee standardisation is that consulting teachers both in Budapest and in the provincial towns are given a so-called teacher's pack, which includes the guide, detailed curriculum, course book, thesaurus, foil and paper sketches, video recordings, home assignments, solutions to homework assignments, in-course tests and keys and exam tests in different forms. In this way, we can guarantee education complying with unified requirements.

The training scheme of the college is also different from that of traditional education in the fact that lectures are not delivered parallel but in a modular form; thus, the curriculum is built up of successive subjects. The "exam period" of that subject starts immediately after the lectures of the module. After this, the student can make as many attempts as he needs to pass the exam, while the lectures and workshops of other modules go on. This requires extra effort from the students.

Students, on the average, participate in more than 20 contact lessons (lectures, workshops, consultations) a week in the regular section and more than 10 in the distance learning section.

International relationship of the College

Our international connections are mainly influenced by our existing contacts with foreign educational institutions of similar profile all over the world and applying distance education.

Co-operation comprises mutual teaching-material development, professional exchange of working methods and exchanges of teachers and students.

We have close contacts with the following institutions:

- UNED - Universidad Nacional de Education a Distancia, Madrid
- British Open University
- Lunds Universitet, Lund
- Darlington College of Technology, Darlington
- University of Hertfordshire, Hatfield
- Université de Rennes 1/IUT de Lannion
- Karl von Ossietzky Universität, Oldenburg
- University of Manitoba (Canada)
- Jutland Open University, Aarhus
- Universitat Oberta de Catalunya, Barcelona

We take an active part in European (European Distance Education Network) and other international distance educational organisations (International Council of Distance Education).

There are an increasing number of projects in which we participate. We have applied for and been successful in the following projects:

- ERASMUS
- IDEAL TEMPUS JEP
- PHARE program HU 94.05. (The broadening of ties between higher education and economy)
- SOCRATES ODL
- SOCRATES/MINERVA Project for Network Building in Open and Distance Education

Conclusions and the next step

Now it is an evidence that there has been a great social demand for the new way of education in Hungary. But we have to react upon the latest technology challenge and have to respond to the new demands.

We put special emphasis on the use of the Internet in the classrooms. Our students can register for exams and check their exam results through the Internet. We are currently working on the introduction of an integrated information system which will provide several more possibilities.

Student records are computerised: files, exam scores, etc. are stored on the computer.

Students can get information from a call-centre through mobil-phone Internet. We train our teachers how they can transfer their materials into an electronic environment.

We feel the effect of globalisation too. There is a great demand for the translation of our materials into English and for our services to be provided abroad.

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MODEST BEGINNINGS—PROMISING FUTURE (DISTANCE LEARNING PROGRAMS IN THE BUDAPEST BUSINESS SCHOOL)

Jozsef Rooz, Eva Sandor Kriszt and Tamas Radvanyi, College of Finance and Accountancy of the BBS

Introduction

The Budapest Business School was established on 1st January 2000 as a result of a merger of three Business Colleges in Budapest, the College of Commerce, Catering and Tourism, the College of Foreign Trade and the College of Finance and Accountancy. The integration of the three colleges created the largest college and the fourth largest institution of higher education in Hungary, with about 20 000 students. When the three colleges merged, two of them had distance learning programs, the third was about to develop one.

The pioneer was the College of Commerce, Catering and Tourism, which launched a distance education program in 1996, and now they have about 2000 students on the program. The College of Finance and Accountancy started its first distance learning program a year later, in 1997, and now has over 600 students. Although smaller and more recent, we'll talk more about that latter program, since we know it slightly better as we work in that college.

The Background

Before talking about how we developed the program, let us give a description of the educational environment in which it arose.

Demand for education has long been on the increase in Hungary just as in any country in the world. Though we are proud of some of our educational achievements, we cannot boast with a high proportion of young people in higher education. At the same time, there is a demand for graduates in various fields, and the successive governments have made their contributions, with more or less success, to expand and upgrade the system of higher education. But similar tendencies prevailed at other levels of education, too. We had, for example, evening courses and correspondence courses at practically all levels of education. Immediately after the Second World War, the department of education introduced primary education in evening courses in small backward villages to completely eradicate illiteracy in the country. The emphasis later shifted to higher levels of education, and for years adults would be sitting in classrooms preparing to complete their studies in secondary education.

Most of those desks are occupied by children, life long learning has shifted to higher education and to different short courses. Evening courses and correspondence courses began to proliferate. It is interesting to note that in Hungary there was a time in the mid-70s, when educational administrators proposed a new form of instruction: distance education. There were meetings, debates, conferences, but suddenly the excitement subsided and died out. For years, no one spoke of distance education in Hungary. True, those were the times when everything was decided by the central government, and someone may not have liked the idea.

The political and economic changes in the late 80s and early 90s have also revealed the shortcomings of the educational system. It is not within the scope of this paper to go into the details of the transformation in the system of education. It should suffice to point out four problems that had to be addressed:

1. There was a need to increase the number of students in higher education since Hungary was lagging behind most countries in Europe in that respect.
2. We had a fragmented and over-specialised system of higher education that was to be simplified and made more efficient.
3. Teaching methods in many instances were obsolete and needed improvement.

4. There was a need for graduates in certain fields where earlier there had been no training (for example, in accounting).

The situation in our college

These were good times in our college, the College of Finance and Accountancy. That was a relatively small college, with about two thousand students at that time. We received encouragement from the government to increase the number of students gradually. At the same time the interest in business careers increased tremendously. We had large numbers of applicants to our programs. It is true that we had a lot of work to do: curricula and programs kept changing continually, new teaching materials had to be developed and new methods had to be applied. There was growing interest for short courses offered by the college and it turned out there was a demand to train adults already working in different lines of business and in government organisations. As practically any other institute of higher education, we also had evening courses and correspondence courses, but they struggled with problems: they were under-financed (a meagre support came from the government), inefficient (there was a high proportion of dropouts), and the whole system had a very low prestige.

It was very natural to think of more efficient methods to be applied, and the answer was obviously distance learning. As soon as the administrators of the school realised the importance to introduce this new form of instruction, some problems immediately surfaced:

- there was a need for new teaching materials (or old materials had to be adapted to meet the requirements of distance learning)
- new methods of teaching had to be introduced (but first had to be learnt by instructors and students alike)
- new technologies had to be introduced (computers and other educational infrastructure was needed)
- new organisational methods were needed (we also needed some new support staff)
- to address these problems, funds would be needed (which we lacked, of course)

Modest beginning

The new concept of adopting distance learning methods required primarily changes in attitudes of teachers and students alike. The Hungarian name for student is *hallgató*, which means *listener*, and that was the traditional expectation: students were supposed to assemble in a large auditorium and listen to the professor who delivered a lecture. Students weren't even supposed to ask questions, and anyone who did so was frowned upon for *interrupting* the professor. There was practically no, or at best very little, interaction between professors and students. There were many exceptions to the rule: excellent and knowledgeable professors who had a very good relationship with the students. Some schools produced really outstanding and remarkable results. But the methods applied in general were not adequate.

We had to learn to look at the students from a different angle. We were to discover that the professors were not "professors" in the old sense of the word, they had to descend from the pulpit where they used to stand. We had to realise that we were there to *provide a service* to the students, to help them learn and not only to *teach* if teaching means putting the material to be studied in front of the student. The English word *tutor* aptly describes the difference. Unfortunately, we don't have an adequate word in Hungarian for that.

There was a need to find an organisational framework and for support staff to handle the administration of this new form of education. That's when a "centre" was set up in the college to kick-start distance education in our college. The "centre" was very modest: a one-window office with a secretary sitting behind a desk, and a part-time director of the program.

It was then that we applied for European support, and we received some in the form of PHARE grant. This was enough to buy a few PCs, photocopiers, and to finance the publishing of a few books that were necessary to start the program. Actually, we produced and printed altogether 32 textbooks. During the period of the development of the teaching materials, we made our best to learn from foreign experiences.

We established direct contacts with the largest European institutions of distance education: FernUniversität-Hagen (Germany), UNED (Spain), and CNAM (France). We are still in connection with those institutions and work together in some projects. We not only learnt from their experiences, but they also rendered assistance to us in training tutors for our programs. The Distance Education Centres of the CFA and CCCT have also links with the University of Le Havre, and the CFA is also co-operating with Anglia Polytechnic University, Cambridge, U.K. All these links were established in the first years of launching the distance education program, and they are still in effect.

In the first year we only launched a pilot course with two groups of students. We gradually increased the enrolment and now we have over 600 students in the program. Students have access to tutorials organised at weekends: on Friday afternoons and Saturday mornings. On those days the Centre is open to meet the students and give them support and orientation. At present there are 5-strong staff to do this job, and we have 62 tutors to meet the students. The tutors participate in methodological training and retraining. They are also involved in the preparation of new teaching materials, and other educational aids.

The most important feature of the system is that we offer the same degree program that is available for the full time students. There is no basic difference in the curricula, except distance learners have a little more freedom in choosing courses and dates for examinations. A full time student needs three years and a half (seven semesters) to complete the program, a distance learner will need 4 to 6 years.

As a recent development, we also have started this program in Zalaegerszeg, a campus of the CFA 240 km south-west of Budapest.

Apart from the degree program, we also launched short courses. The first was a five-module course meant to cater for the needs of the business community. They offered short courses in Finance, Accounting, Business information systems and Business English. A similar course was organised in the subject area of Public Finance. The preparation of those programs was sponsored by TEMPUS JEP. Now we want to continue them on a fee-paying basis.

Further Development

We have a dream. As a business college and as the largest college in Hungary, we want to further expand our programs in distance education. We want to combine the forces of the three colleges, and we hope that that will help each constituent college to become stronger. In order to achieve that, we are aware that we will have to accomplish a few more things:

1. We will have to complete the existing learning packages with multimedia and video materials. We should also collect more case studies, exercises and prepare new assignments for the students.
2. We want to set up and operate a network of distance learning centres. Since the CFA has two satellite campuses (one at Zalaegerszeg and the other at Salgotarjan), we may have a competitive edge.
3. We want to expand our educational infrastructure. This implies the following:
 - Setting up a call centre to establish contacts with the students more easily
 - Increasingly relying on the Internet and email facilitate contacts with the students
 - Involving telephone and mobile phone services in teaching and administrative work
4. We will need to continue the training of trainers and students in the methods of distance learning. In our experience poor performance is due to the fact that some students simply don't know how to study.
5. We will do our best to maintain connections with other distance education institutions in Hungary and abroad
6. We want to offer help, if needed, to the third college of the BBS in developing and expanding their distance education program

Conclusion

We are very hopeful that distance education has a long future. We know that it is perfectly operational in business studies for two reasons: first, because businessmen are usually very busy but at the same time they always need further training, and secondly, because most of these subjects are easily adaptable to distance learning methods.

At the same time, we have always tried to avoid making rash decisions. We have advanced step by step and we will do so in the future too. We are aware that the centre of this education is the student, and it is his money that we are using and his resources are also limited.

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THE TRAINING VILLAGE – ELEARNING IN THE EUROPEAN TRAINING COMMUNITY

Jane Massy, Consultant Editor, eLearning pages, ETV, CEDEFOP.

Introduction – Using the ETV to survey, reflect and report on eLearning

In March 2000, the Training Village (ETV) at Cedefop opened its first eLearning pages. The aim was to create a resource centre for information about eLearning products, services, research and news and to develop an active community of training professionals interested in eLearning design, development, implementation and evaluation, most especially in Europe. By early 2001, the eLearning pages had helped to generate a registered user base of over 13,500 participants. One primary mechanism for generating interest and stimulating participation was a series of web surveys and follow up reports covering issues such as the economics of eLearning, eLearning and trainer skills, basic skills and eLearning and trades unions and eLearning. In addition, a major survey of the current state of supply and demand for eLearning in Europe was launched in January 2001 and will be completed by the middle of the year. One of the most important features of the eLearning pages is the database for elearning product and service information, which is designed around the IEEE LOM standard. This paper reviews the services in the eLearning pages in the ETV and the strategy behind the development of these services. It describes the challenge of establishing this resource centre and plans for the future.

What is the Training Village?

The Electronic Training Village is the web based resources and information centre of CEDEFOP, the European Centre for the Development of Vocational Training. It has been established since July 1998 and has over 13,500 registered users. Users are required to register in order to access all services but there is currently no charge for any services provided through the ETV.

The screenshot displays the ETV website interface. At the top, there is a navigation bar with icons and labels for: ETV news, Information Resources, Projects and Networks, Exchange of views, Search, Register, Help, Site Map, and the ETV logo. Below this is a secondary navigation bar with links: [Bulletin Board], [Research], [Technology], [Showcase], [Buzz], [Surveys], [Case Studies], [Products & Services].

The main content area is divided into several sections, each with a title and a brief description, followed by a 'MORE ►' link:

- EVENTS**: Internet usage in Europe is still lagging very much behind the USA. The gra...
- Bulletin Board**: Visit our experts and add comments, questions and links.
- Research**: News, abstracts, reports, strong focus on learning and social/human science research.
- Technology**: News and links to information, web sites and demonstrations of new developments.
- Showcase**: Examples of best practice, descriptions and comments by experts, with links to demo.
- Buzz**: All the buzzwords and terms that are new and not always explained.
- Surveys**: Regular small on-line surveys on aspect of elearning. Complete the on-line survey.
- Case Studies**: Studies with expert commentary on actual usage/applications in organisations, with opportunities to discuss background, context and results.
- Products & Services**: Short descriptive searchable listing of products and services available. Providers are offered the opportunity to add their products/services to the listing.

On the left side, there is a vertical menu with icons and labels: European Journal, Policy Report, Tinet, Elearning, Research Laboratory, Management Board, Social Partners, Scenarios and Strategies, Vetnet, and Cedra.

On the right side, there is a tree structure diagram and the text 'eLearning Main page'. A large 'eLearning' logo is positioned vertically on the right side of the page.

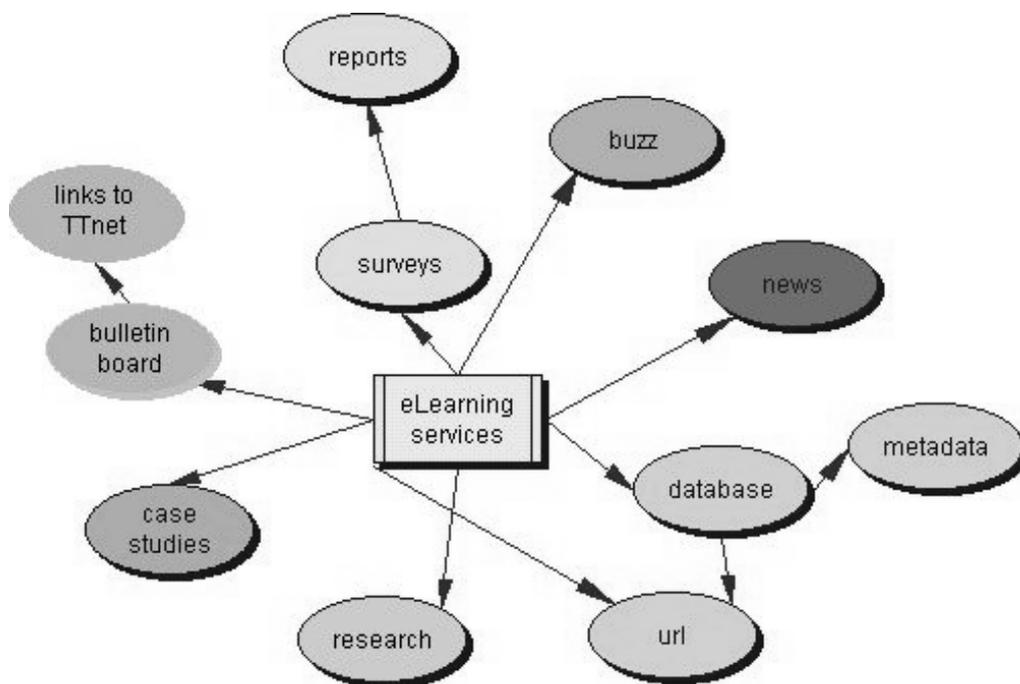
At the bottom, there is a footer with links: [ETV News], [Information Resources], [Projects and Networks], [Exchange of views], [Search the ETV], [Register], [Help], [Site map], [Home].

The Training Village is aimed to provide information and communication services to training practitioners and policy makers and to create a community of best practice in training design, delivery and research.

The eLearning pages

In March 2000, the first eLearning pages were launched on the ETV. Cedefop had decided that the subject of eLearning had grown to be of such importance that a set of discrete services would be of significant interest to its registered users. At the time, the registered user base was 6,700 and it was believed that the creation of these eLearning information services might in themselves help to generate increased traffic to the Village and would provide a model for other electronic services related to vocational education and training. The aim of establishing the pages was to create a resource centre of information about eLearning, primarily for training practitioners and to use the village as a space to develop an active community with a shared interest in eLearning. The strategy was to establish a range of experimental services to see what might stimulate registrations and generate increased traffic from existing registered users. Within 10 months the registered user base had doubled justifying the initial objective and the approach that had been adopted. This increase must of course be seen in the context of an extraordinary jump in the level of interest and investment in eLearning both in the public and private sector at the time not only across Europe with the eEurope and later, the eLearning initiative but across the globe.

The eLearning information services



The database

A primary objective of the eLearning pages was to try and help answer the question asked so often by practitioners – where might I find an eLearning product or service specifically tailored to my industry/target group? A database was constructed at two levels – a shallow, minimal description level and a comprehensive set of searchable descriptors, which would allow detailed description of eLearning objects or resources.

The Url database has limited, shallow level descriptions, which has the attraction of being quickly assembled and updated and provides information about a web site that has information about specific products or services or the actual resources themselves. Each entry has the web page title, URL, key words and a short description. No attempt is made to evaluate the resources and resources are searchable by key word and are grouped according to certain sectors or objectives e.g. Construction as an example of an industry sector and Guidance/Orientation as an example of a resource objective. There are also quite extensive lists of eLearning portals, tools and learning environments.

At a much more comprehensive level, the database for eLearning objects or resources aims to provide detailed descriptions of eLearning content from public and private commercial sources. This database was constructed according to the descriptor fields in the IEEE Learning Object Metadata standard. By constructing the database in this way, we aim to offer not only a database which will meet future metadata standards but also provide a searchable tool that can be used for direct eLearning object information encoding by the owners of the resources. We recognise that for many designers and developers of eLearning resources, the development of specifications and standards is unfamiliar territory. We therefore constructed a front-end wizard to provide immediate user-friendly assistance in encoding learning resources information. This way, the eLearning resource owner gets to record their information in our searchable and publicly disseminated database and can learn to describe their resource according to the standard by doing it! It also provides training professionals with a searchable resource that introduces them to the standard and may help to develop their awareness of the levels of metadata descriptions that should be provided with high quality eLearning resources.

We are aware that these are early days in the development of metadata standards in eLearning and it is possible that as specifications and standards develop, we will need to adapt our approach. We certainly view it as essential that we maintain a watch on standards and specifications development and provide on-going information about these developments to our users.

Surveys on aspects of eLearning

Using commercial web polling software, we have so far launched and reported on the following aspects of eLearning

- The use of email in eLearning
- Trainer skills for eLearning
- The economics of eLearning
- ELearning and Adult basic skills
- European Trade Unions and eLearning

Other proposed surveys for this year include

- Evaluation of eLearning and impact on performance
- eLearning and Universities' provision of post-grad/professional/CVT
- eLearning and assessment/accreditation
- eLearning for the disabled

There is also a large-scale survey, which utilises the web polling software as well as more traditional surveying methods that aim to ascertain the scale and scope of eLearning supply and demand within Europe. This survey is expected to report by the middle of 2001.

All our web-based surveys are launched directly to our registered user base. In addition, extra promotion to specialist groups takes place for each survey. All promotion occurs electronically.

What have we learned about surveys?

A critical mass of loyal and engaged users is essential. We have built a community of over 13,500 registered users who are directly involved in vocational education and training and who are active and experienced email and web users. This means that for a survey we can gather views from a clearly defined and engaged user base. To date some of our surveys have received over 600 responses within 10 working days. **Immediate and open reporting assists the process of building a community.** Users participate partly because they know they will receive reports within a month of survey launch. Care needs to be taken not to alienate the community by requesting too much from participation. If promises are made about reporting, these must be adhered to if users are to remain loyal and interested. **Surveys receive a better response if launched early in the week.** Reminders do stimulate responses but need to be

carefully managed. Surveys should never ask more than 5-6 questions and the expert designer will construct a survey with few questions but many response options that can be cross tabulated. This provides the respondent with something very easy and fast to complete and the surveyor with a rich result. **Each survey provides an opportunity to extend the registered user base** to include special interest groups and we have tried to consult with appropriate user groups in the design of the surveys. Each report provides an opportunity to build links to special interest groups. All our reports are provided free of charge on the web <http://www.trainingvillage.gr/etv/elearning/surveys/surmain.asp> **No false claims should be made for surveys of this kind.** They are aimed at eliciting views, testing assumptions and monitoring trends. They make no claims to be comprehensively representative or statistically accurate. They simply provide a range of perspectives from which we can begin to analyse and understand the development of eLearning and the impact of technology on education and training.

Somewhat different is the first major attempt to assess the current extent of eLearning within vocational education and training in Europe. Preliminary results are based on responses to the survey posted on the Electronic Training Village (ETV) www.trainingvillage.gr website since 1 February 2001. The survey will be supplemented by other data on eLearning being collected over the next couple of months.

Some of these preliminary results to date suggest that:

- In the period 1999-2000 training suppliers experienced strong growth in revenues from the sale of e-learning materials and even stronger growth is anticipated for 2000-01. As a result, elearning will account for an increasing proportion of materials revenue - jumping from 23% in 1999 to almost 40% in 2001.
- Expenditure by training users/purchasers on operating costs associated with elearning will also grow fast, averaging around 25% per annum between 1999 and 2001.
- Growth in expenditure on operating costs associated with elearning among users should average around 25% a year between 1999 and 2001.
- Growth in revenue from - and expenditure on - capital equipment associated with elearning will average around 16 to 19% over the period 1999 to 2001.
- e-learning expenditure on operating costs as a proportion of all operating costs for all forms of training will increase gradually from 10% in 1999 to almost 14% in 2001
- Training using elearning methods is most common for ICT, where this form of training met 43% of users' needs.
- On average a third of purchasers' training needs were met by elearning in the following subject areas: management, new product/service training.

Other services

The world of eLearning and technology-supported learning is constantly changing and keeping up with news is a challenge for all practitioners and policy makers. The ETV eLearning pages offer a range of news items that relate directly and indirectly to elearning. In addition, new technologies, new approaches and ideas generate terms and jargon that many find difficult to understand. We have a buzz page that gives some definitions of some of the 'buzz' terms around and invite our users to provide us with more.

Creating services for special interest groups within education and training

As eLearning is adopted and integrated more and more into mainstream education and training, more information is sought from practitioners about eLearning products, research and services relating to their specific needs. In 2001, we intend to focus our resources building on specific industry sectors as well as a wide range of horizontal issues such as quality, tools and platforms, basic skills. Building industry related resources can only be done in partnership and we are actively encouraging European and global industry training networks and professional communities to provide us with information about research and eLearning services in their sectors that we can add to our site. We are conscious that much of the data easily retrievable from the web is non-European and we hope to redress this balance by providing a strongly European focus to the resources.

Other future plans.

We are committed to maintaining a ‘watch’ on metadata specifications and standards as we believe that consensus around the adoption of common standards at a European level is essential for building a coherent elearning community of users and suppliers in Europe. As much of the work on standards is taking place at a global level, we are capturing this information and reflecting on the impact on Europe and taking a position to support an approach that supports the Europe Union’s economic and social objectives. We intend to continue to provide our users with information on specifications and standards as it becomes available and to play where we can, an active role in the development and more critically, the dissemination of standards. As noted above, other plans for this year including building resources in specific industry sectors and working with partners to populate our database. Our surveys will be run approximately 8 times this year and we will continue to use our reports for discussion and reflected in eLearning, notably at a European level.

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LIFELONG LEARNING IN EDUCATION & TRAINING SYSTEMS INFORMATION, SKILLS AND EMPLOYABILITY

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Introduction

Adaptation of the education and training systems to Lifelong learning (LLL) implies more seamless learning trajectories. Another consequence is a need to improve the provision of information on learning opportunities. Both factors affect the design and functions of public and private learning systems.

The purpose of this paper is to take stock of LLL demand, supply and environments. LLL can be defined as “encompassing all purposeful learning activity, whether formal or informal, undertaken on an ongoing basis with the aim of improving knowledge, skills and competence”¹. An underlying idea in the present note is that the vast ambitions behind LLL for all should be met by identifying the major user groups involved. Alongside the need to improve the contents of technology supported learning tools it is paramount to provide easy access to learning resources. This entails the challenge to target information for specific user groups.

The present paper builds on several studies launched by IPTS with regard to technology-supported learning and Lifelong learning, in particular a study labelled “Citizens’ Digital Learning”². A central theme in these studies is that the provision of information on learning opportunities should make use of the latest available technologies for information collection, storage and retrieval. By this means information can be easier transformed into knowledge and later embodied as personal skills.

Current policy debate on LLL is often based on assumptions on an easy transfer of skills from academia to industry. The possibility of developing generic or transferable skills (opposed to core skills) varies between scientific disciplines. As pointed out in a collective work on “Skills development in higher education and employment”³, what are transferable skills in one discipline can form part of the core skills in another discipline. Communication is a core skill in law, as is problem solving in engineering and IT skills in computer science. In addition, there is no recipe for transforming core skills of a discipline acquired at universities to work-related skills⁴.

Main structure of the paper

After presenting the methodological and empirical background for the transformation of the education and training systems, we analyse Lifelong learning along the dimensions *demand* and *supply*, before outlining the crystallisation point (labelled *LLL environments*). Finally, we enumerate the interrelated social and technological challenges characterising the future LLL systems. In particular, we highlight the need to better grasp the transformation of (academic) skills for lifelong employability.

Methodological background

The present paper rests on a fine-tuned distinction between the notions technological and social learning systems. When proposing a separate notion for the social aspects of the learning systems, we attempt to better focus on the societal transformation of the education and training systems.

¹ Cf. “A Memorandum on Lifelong Learning”, European Commission, SEC(2000) 1832.

² Undertaken by ECOTEC Research & Consulting Ltd.

³ Neville Bennett, Elisabeth Dunne and Clive Carré, Open University Press, UK 2000.

⁴ *ibid.*

- **Technological learning systems**
Describes technological solutions to support learning. An increasing number of e-learning platforms are available on the market but, in general, there is not enough content material to host these platforms. When learning solutions are integrated in one product which can be purchased at a reasonable price, companies and ICT-skilled people acquire more autonomy for making their own learning platforms. However, this trend reflects the technical possibilities, the (social) complexity behind good learning solutions is another issue.
- **Social learning systems**
Describes the entire socialisation process of the learner. The emphasis in this paper is on the transformation of the education and training systems towards LLL. This entails increasing pressure on the systems in particular with regard to the private/public role and the formation of new partnerships between the actors involved. Such partnerships are mainly set up to develop learning content (products) and to facilitate the passage of candidates from academy to industry.

In brief, the process of LLL transforms the education and training systems in a manner often labelled “the opening of systems”. In the next paragraph we will outline the main features of the present transformation.

Empirical background

- The demographic evolution of the European population has as a consequence that more middle-aged and old workers have to be trained and retrained. The average age of the European working population was stable at 40 between 1975-95 when a constant rise began. From 2010 on, older workers (55-64) will account for a greater share of the working-age population than younger workers (20-29) whose share will continue to progressively decrease⁵. Moreover, the strengthening of a knowledge-intensive economy will exacerbate the constant need to retrain middle-aged and old workers.
- We are moving towards an international market of higher education with a fierce competition in attracting foreign students. This is particularly true for the English-speaking countries (UK, Australia and USA...). The growing market for technology assisted learning further underscores the internationalisation of education and training. In addition, leading countries define specific measures (like ICT green cards in Germany) to attract highly skilled personnel to flourishing economic sectors.
- Education and training systems are being transformed by the implication of more stakeholders. 400 corporate universities existed at the beginning of the 1990s, 1600 at the end of the decade. These universities form alliances with traditional (mainly public) universities.
- More and more companies (also those who have not set up corporate universities) become providers of education and training. They are involved in creating e-learning partnerships, where both private and public actors are involved.

LLL demand, supply and the environments are analysed below, structured along a split of user groups into practitioners, policy-makers and researchers⁶.

Demand of lifelong learning

The demand can be split into a variety of dimensions highlighting key issues.

⁵ EUROSTAT estimations further elaborated in the “Demographic map” as part of the FUTURES project run by IPTS.

⁶ Cf. study done for IPTS by ECOTEC.

Dimension	Key Issues
Gender	<ul style="list-style-type: none"> • Research has shown that men and women have different attitudes to technology • Learning products need to suit differing learning processes and preferences
Age	<ul style="list-style-type: none"> • For younger people, ICT may be an attractive way of involving them in learning • There is an increasing need for older workers to upgrade their skills or retrain • ICT literacy and confidence in using technology may pose a problem for some older people • Different age groups and backgrounds will require different learning products • Younger people may be dependent on local initiatives for technical access because of entry costs
Employment status	<ul style="list-style-type: none"> • Asynchronous learning offers people the freedom to learn in a way that avoids conflict with work or other commitments • Given that ICT skills are generally developed at work, it is likely that those who have been away from the labour market for a certain length of time will be at a disadvantage • Access to ICT may be a significant barrier to entry for some socially excluded groups
Educational Background	<ul style="list-style-type: none"> • Access to and confidence with ICT is likely to be influenced by educational experiences at school and/or university. • The level of customisation in training allows people to learn at their own pace irrespective of prior education experiences • The variety of different learning styles could encourage some people with negative perceptions of learning to rethink and change attitudes.
Urban/Rural	<ul style="list-style-type: none"> • Rural communities have seized on the benefits offered by ICT-based lifelong learning to provide equal access to a wider range of learning opportunities • ICT-based learning or ‘tele-learning’ has the potential to improve attitudes and confidence in tele-working which can promote employment opportunities in remote areas • Urban communities are likely to lead in ICT infrastructure development and rural communities’ access may lag for several years.
Disability	<ul style="list-style-type: none"> • ICT offers people with disabilities an independent communication tool and source of information that presents significant benefits. • People with disabilities may have particular needs in terms of hardware or software which could necessitate specialised e-learning products and/or hardware
Language	<ul style="list-style-type: none"> • Currently ICT content is predominantly produced in the English language and it is likely that initially learning products will focus on anglophone users.

A preliminary conclusion is that ICT based learning represents a potential tool for groups less accustomed to learning, but specific measures have to be put into place for these groups, in particular with regard to information.

Supply of lifelong learning

The following table summarises the key issues for policy-makers and researchers:

Dimension	Sub-dimension	Key issues
Types of learning	<i>Types of learning opportunity</i>	<ul style="list-style-type: none"> • ICT-based learning is a small part of the total learning market • ICT skills development courses offer vast options, but with little guidance to the consumer • Information, advice and guidance for adults has tended to be neglected but is an essential under-pinning to lifelong learning especially for the socially disadvantaged
	<i>Role of informal learning</i>	<ul style="list-style-type: none"> • Informal learning provides a key part of the total learning experience, but its impact is hard to assess
	<i>Delivery methods</i>	<ul style="list-style-type: none"> • Delivery methods can be classified into print, video, on-the-job, classroom and technology-delivered and have a variety of advantages and disadvantages
Types of providers	<i>Public</i>	<ul style="list-style-type: none"> • EU and Member States policies and actions are critical in the ICT-based learning arena, sometimes involving major partnerships with private sector players • Much small scale activity at regional and local level
	<i>Private</i>	<ul style="list-style-type: none"> • Perhaps the major player in development of ICT-based materials
	<i>Third Sector</i>	<ul style="list-style-type: none"> • Plays a key role in making lifelong learning accessible for disadvantaged communities
	<i>Intervention models</i>	<ul style="list-style-type: none"> • There is a range of possible intervention models: <ul style="list-style-type: none"> – laboratory – mainstream – franchise – public-private partnership – network

Dimension	Sub-dimension	Key issues
Key supply issues	<i>Barriers to market entry</i>	<ul style="list-style-type: none"> • Financial – entry costs can be very high • Conceptual – bringing technology and content together is a particular challenge, requiring development of content providers • Technical – concepts can be ahead of the ability to deliver given, for example, constraints on bandwidth
	<i>Accreditation</i>	<ul style="list-style-type: none"> • Needs to be secure as distance learning is open to abuse • Needs to suit modularization of learning
	<i>Quality</i>	<ul style="list-style-type: none"> • Product – Quality assurance is hard but essential in the context of the proliferation of learning products • Human resources – There is a need to ensure teachers and trainers have the skills to design and adapt ICT-based materials

Equal access to learning opportunities depends on updated and targeted information⁷. European education and training systems have to tackle the new conditions for knowledge management and delivery of knowledge, particularly shaped by the Internet revolution.

One specific issue concerns the development of search tools for retrieving information on Education&Training from Internet, especially when the Universal Mobile Telecommunications Systems prevail. Here, standardisation of metadata is the key issue. Numerous research projects as well as European and international bodies have embarked on a long term work for setting standards for classification of the information stored on web sites with a view to have it easily and correctly identified by search engines.

In addition to a strengthened work on metadata⁸, continued efforts are needed to develop Intelligent Agents and Data Mining Techniques.

Lifelong learning environments

Learning environments are a kind of meeting place for the exchange between learners and providers. Learning can be purchased directly by the individual or indirectly by the state, an employer or a third sector organisation.

The following table enumerates a number of key issues relating to the most important dimensions of learning environments having effects on policy-makers, researchers and practitioners.

⁷ This point is also made in Technology Delphi Report Austria for the Ministry of Science and Communication, "Ergebnisse und Massnahmenvorschläge", p. 133, where there is a plea for databanks on learning opportunities and a EU-wide education server.

⁸ Cf. one upcoming standard: <http://purl.oclc.org/dc/groups/education.htm>

Dimension	Key Issues
Features of lifelong learning markets	<ul style="list-style-type: none"> • Unbounded nature of markets • Differentiation • Complexity of demand and supply
Market power	<ul style="list-style-type: none"> • Different learners have different resources to bring to the learning market • Traditional learners have power to affect the market • Non-traditional learners have a weak market position • Key role for Third Sector in supporting non-traditional learners • Key role for employers in employment-related lifelong learning
Role of different learning environments	<ul style="list-style-type: none"> • Variety of different environments available • Different environments better suited to some learners than others
Barriers to effective market operation	<ul style="list-style-type: none"> • Accessibility – access highly varied across social groups and Member states • Awareness – major variation in product awareness and understanding • Affordability – major factor in creating a ‘digital divide’ • Continuity – maintaining interest of remote learners is a particular challenge
Improving market information	<ul style="list-style-type: none"> • Understanding learner needs – significant improvement in availability of diagnostic tools needed • Making available better, more timely information about learning opportunities – particular issue for socially disadvantaged
Learner of the future	<ul style="list-style-type: none"> • More demanding than current learners

Contemporary learning environments are to a large extent defined by the “market power” of individuals and of individuals acting together. Many observers present a diagnosis of inertia in the present education and training systems due to a slow adaptation to LLL. It is estimated that the future learning environments puts the individual learner in a stronger position due to the growing technical opportunities for self-learning.

Learners of the future will demand:

- constant access to up to date material
- quick, timely skill acquisition
- arenas for the effective exchange of ideas
- flexible, responsive, enjoyable environments

Learners of the future will be:

- highly discerning customers
- more active in the setting of their learning goals
- pilots of their own learning experiences

The provision of education and training on the Internet (virtual courses, schools and universities...) fundamentally changes the learning context. Further development of learning technologies offers new pedagogical opportunities that so far are not sufficiently exploited because - in many cases - traditional paper-based learning materials are simply put into an electronic format.

A sketch of the future systems

The need for improved quality of the learning software offered to lifelong learners illustrates the interrelated nature of the future challenges. Good learning software depends on a strong collaboration between a variety of professions and stakeholders that all contribute to the making of this complex product⁹. It is therefore pivotal to stimulate partnerships involving i.a. practitioners, learners and SW specialists. In other words, we face a combined technological and social challenge.

The combination of Internet technology and mobile telephone (Universal Mobile Telecommunications Systems) will create new learning opportunities for the citizens in the sense that the physical room of learning expands drastically. The “learning situations” will increase in number and will become more differentiated. Hence, technically speaking ubiquitous learning is possible, but more research is needed to pedagogically design such learning.

The major shift in education and training will probably take place in what has traditionally been called further and continuing education. Here, virtual education by means of ICT supported learning will prevail to the expense of classroom teaching. In initial education (from primary, to secondary and up to post-secondary level) the importance of physical presence as part of a social learning process counteracts the decomposition of the school as a learning space. The notion *candidata cantina* is not an academic title but serves as a helpful notion to understand the survival and vitality of campus universities (although increasingly computerised) with their frequently visited student cantinas.

No doubt that the school will increasingly make use of ICT supported learning as a pedagogical tool, but it is unlikely that teaching will move back to the private homes, which together with the church, in former times constituted the learning space before compulsory education was introduced as a social welfare reform. Given that private homes also in future will be unequally computerised, it is likely that the public education system will maintain initial education as a kind of melting pot for “equal access to ICT learning”.

Equal access to technology based and Lifelong learning cannot be achieved before information on demand and supply issues is improved. A practical approach to this challenge is to analyse information needs according to user groups (cf. the discussion above). A further step is to analyse future skill needs, without falling into the usual trap of extrapolating past employment trends and past skill profiles of new candidates entering the labour market. One approach presently tried out in an IPTS-study for the European Parliament is to link skill analyses to different technology scenarios.

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⁹ Cf. the UK foresight study, (“Technology Foresight – Progress through partnership”), Office for Science and Technology, “Leisure and learning”, p. 57.

AEN – ADULT EDUCATION NETWORK A SOCRATES / MINERVA PROJECT

HOW THE EXCHANGE OF EXPERIENCE ON A EUROPEAN LEVEL CHANGES THE PERSPECTIVES OF ODL ON THE NATIONAL LEVEL

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From “AEN-Austria” to “Adult Education Network” - a SOCRATES/MINERVA-Project

The origin of the project dates back to the year 1996 when Austrian institutions in adult education, mainly schools and colleges for people under employment, felt the need for an international orientation in their efforts to improve methods of open and distance learning in their schools. At a SOCRATES-Call-Meeting in Linz in November 1996 the idea for a network of schools for adult learners in Austria was born and realised. “AEN-Austria” organised meetings for the exchange of experience in ODL, video-conferencing with experts at “Fernuniversität Hagen” in Germany, teacher training for HTML, quality management at schools, evaluation criteria for educational software and provided first impressions of web-based learning-management systems. This was a new experience, opening up new perspectives and encouraged seeking the European dimension for new horizons.

The initial situation of adult education institutions appeared to be quite similar in Europe at the time of the establishment of the partnership. Open and Distance Learning was mainly promoted and realised by universities and the use of ICT in teaching and learning was rather driven by the possibilities of technology than by the methodological principles of learning.

Realising forms of ODL at the university level means working with students who have shown with their university admission exams that they are professional learners. Working with adults who have not seen a lecture room for 15 years or more sets much higher demands on the side of the teachers and organisational structure of courses and institutions. Or to touch down to the practical level: what’s the use of showing the students the benefits of multimedia-learning when there is no sufficient bandwidth available, they can’t get connected to the Internet at home and can’t afford the costs for online-learning. This may still be seen as an explanation why the application of the AEN-project was at first not accepted in 1998, however not for lack of quality but rather because of doubts that the project objectives could also be realised on the upper secondary level of education in schools and colleges for adult learners.

The AEN partnership

The main target at the establishment of the partnership was to find a mixture of institutions on different levels. In our view this intended mixture guarantees a mutual exchange of experience and a discussion on a very practically oriented level.

In the first place, the idea that experienced institutions provide assistance for those in need of support was set as an important goal.

Secondly, various types of educational institutions representing different levels of education had to be involved, although adult education institutions on the upper secondary level are predominantly represented in the partnership; universities play an important role in providing the theoretical background and sharing the knowledge and experience they have. In the practical everyday work at school there seems not to be much space for elaborate theorising. Learning by doing and the practical work with students characterise the work. On the other hand university lecturers seem to appreciate the look into everyday practice at schools.

In addition the AEN consortium succeeded in finding a powerful partner - Siemens / bitmedia - on the company level.

Thirdly, the participation of teacher training institutions reflects the necessity to train the trainers as it is also stated in the e-learning initiative launched by the European Union. Basically, teacher training supported by the project focuses on two target groups: on the one hand teachers are trained in basic and more advanced computer skills to improve the computer knowledge of a whole teaching staff, but on the other hand courses for content creation and the administration of electronic learning management systems are also offered for teachers who have already gained expertise in distance teaching.

Fourthly, associations, in particular EDEN which is partner in the project, play an essential role with regard to the dissemination of the results. This platform of dissemination will eventually lead to the continuation of the partnership and probably arouse the interest of other adult education institutions to join a bigger European network to facilitate the exchange of experience and good practice in order to push the development of ODL structures in adult education.

Finally, the Austrian Ministry for Education, Science and Culture is the applicant and contractor vis-a-vis the European Commission and thus underlines the importance of the involvement of the governmental institutions in the EU member countries.

Thus the project is expected to lead to a kick-off concerning the practical use of ODL methods in the partner institutions, and, furthermore, should also contribute to e-Learning initiatives in the member countries.

The target group - People at a disadvantage

Initially there were three forms of disadvantage to overcome by means of DL:

1. Disadvantaged for geographical reasons (e.g. because of the topography of a country or long distances adult learners have to overcome to attend evening courses).
2. Social reasons: e.g. single parents and mothers who have to look after their small children are in danger of being deprived because they simply cannot attend evening courses five days a week. Many of those want to re-enter the job market and therefore attend courses to enhance their skills and knowledge and to improve their chances on the competitive labour market. Moreover, computer-assisted distance learning helps to promote Internet and computer skills and contributes to overcome the disadvantages. Thus it has become evident that distance learning is particularly attractive especially for women as it offers much more flexibility in time than other forms of learning.
3. Shift workers and people with permanently changing working hours are a big group interested in DL. The increasing pressure on the labour market and the extension of working hours into the evenings have turned out as new barriers to further education. DL with its forms of flexible learning offers new chances for this group.

In general it seems that adults in DL can be characterised by high motivation and a very ambitious approach to learning. They see DL as a new chance which they are decided to use. Besides they are usually in their early thirties, have a clear perspective what they want to achieve and appreciate the new opportunity to get ahead.

The Project Objectives

The aim of the project is to develop a co-operation between institutions and organisations with experience in adult education and ODL in 9 European countries. It includes the following objectives:

- To implement an electronic network for teachers and students: Practical models will be developed to set up support systems and to simplify access to networks and electronic learning environments.
- To develop criteria to improve the organization of courses and to improve the methods of counseling.
- To develop example learning materials and modules.
- To contribute to the further training of teachers by the dissemination of experiences, know-how and innovative methods in ODL including the development of exemplary modules for the training of teachers.

The project Adult Education Network aims at studying the development and realisations of e-learning on a European scale and gains insight into pedagogical aspects of web-courses.

Internet-services for communication, authoring tools for content development and electronic learning environments for the management of students and teaching material are key-issues of computer assisted learning at the distance.

The whole project activities are focused on the practical work with adult learners.

Orientation

The first trans-national meeting of the AEN-partners in Strobl (Austria) showed that the idea of co-operation in the polyglot context of Europe is difficult to realise. Every partner works in the specific framework of the educational system of his particular country and develops courses and materials for his specific target groups according to national curricula in his own language.

In spite of the different levels of development and the different targets of the individual institution the common interests and individual strengths and potentials of the AEN-consortium became evident at the first meeting and have led to a mutual exchange of ideas, experiences and perspectives.

The input at the meetings has led to several initiatives on the respective national level, has helped to avoid aimless paths on the way to improve ODL and has warned the newcomers in ODL of the dangers of seemingly successful technological innovations that don't work out in practice on the non-academic level with the infrastructure available to the ordinary learner.

Common problems and perspectives across Europe

Computer assisted distance learning requires the often quoted changes in the roles of students and teachers. The students as home-learners have to cope with technical problems in order to realise their private access to the Internet and individual problems like discipline, time management and how to learn in their role as home learners. Frustration and feelings of being left alone are limited by regular face-to-face meetings and close contact among the students via e-mail and telephone. Teachers have to cope with their changing role from the "sage on the stage to the guide on the side" or the guide on the (web-)site and it is still uncertain to which extent the teachers can take over the new role of designers of online courses and web-based study material as this job is closer to being author of a coursebook than teacher. Besides being a good teacher does not necessarily mean being a good author.

Open and distance learning always puts the students first and defines students as the central elements of the learning process which imposes a much higher responsibility for their own learning process and the way they use the resources that are made available by the educational institution. On the other hand, this conviction will inevitably lead to a big challenge for teachers who are still deeply rooted in their educational systems and frameworks. DL-courses require a much stricter standardisation, planning and condensation of content and make it almost impossible to react to actual topics from the media. On the other hand those teachers who work in DL have got a much more critical approach to their traditional classroom teaching and see this as a positive spin-off effect of their work in their new role.

The choice of educational software, authoring tools and learning environments depends on the respective kinds of students, financial means of the particular institutions and their individual requirements. Server-client structures and networks usually work smoothly these days, but European governments seem to invest merely in the acquisition of hardware and tend to forget the costs of manpower vital for keeping the systems in working order for 365 days a year.

This technological aspect, however, adds a new dimension to the work of the teacher. Up to now a teacher could very well act and work like an independent entity in his or her school-microcosm. Writing good material for the web is so time-consuming – Richard Straub, Director of Learning (IBM) speaks of one week's work for one and a half hours of web-programme – that teachers have to team up for content creation and still need help by IT-experts for the implementation of multimedia elements and the final act of putting their material online.

The lack of standards in the field of educational software and electronic learning environments became obvious, also in this project. For this reason only criteria and requirements for these applications could be developed in the project. Some initiatives for teacher training for content creation showed that also much of the software available is rather “under construction” than fully developed or it is so complex that teachers give up as the relation of time-input and final product is so poor that it brings every enthusiast down to earth.

As standards are missing there is still no European market for educational software, not to forget the language barriers that will always put Europe at a disadvantage compared to the Anglo-American market. This may be less obvious on the academic level, but it is an obstacle at school-level where even teachers are often put off by the fact that the software is not in their native language.

Teachers who have been involved in DL are used to write up their own materials and adapt existing assignments to the needs of distance learners but they themselves need competence centres that provide help to turn the storyboards and ideas of teachers into web-based learning material. In a recent questionnaire about the situation of ODL at their respective institutions many partners criticise the lack of support in the field of ICT at their schools. The other obstacle is that in some countries the teachers should do all this extra work in addition to their teaching commitments.

Beyond that a sound methodology and pedagogy of tele-teaching is not in sight. There are some good examples available but different subjects require different approaches. A course in sciences will differ greatly in its technological requirements from a literature course. In addition to that teachers are very concerned about questions of copyright where they feel being left alone – a very serious problem when it comes to the use of audio, video, pictures, diagrams and animation for ODL courses, all essentials when the product should come near something that deserves the label “multi-media”.

From European co-operation to national developments – some representative examples

IRRSAE Toscana / IT

The Italian partner's main motive to join the AEN group at the time of the establishment of the partnership and the application was to search for orientation in the field of open and distance learning for adult learners and to get to know successful models of ODL as well as to gain experience in this field. In fact this also matched one of the basic ideas of the project that experienced partners support those who are in need of help and assistance.

The Italian co-ordinator, Ms. Anna Fochi / IRRSAE Toscana, has undertaken enormous efforts and realised the project objective of establishing not only a network of adult education institutions in Livorno but also succeeded in the practical establishment of a distance education centre at a college with adult learners. The following activities have been carried out:

- Establishment of a task force of headmasters and teachers in the region of Livorno with the aim of an orientation towards open and distance learning in selected secondary colleges with adult learners - involvement of regional and local authorities and co-operation with these authorities.
The experience gained and the examples given in the AEN project workshops were transferred on the national / regional level. Moreover, the Italian action research group was supported by Italian experts from Firenze University and a technical institute.
- Development of ICT training modules for students and teachers in adult education - training courses in the use of Internet and Internet services.
- Preparation and development of strategies concerning the implementation of experimental ODL modules in project year 2.
- Design of specific curricula and experimental projects and materials for the ODL model at the colleges. Coaching of the colleges, monitoring and evaluation of the realised projects in order to continue and modify the experimental activities successfully.
- Development of experimental e-learning modules tailored to an open and distance learning centre in a technical secondary college in Livorno and produced by the Italian AEN group of teachers.

- Opening of an open and distant learning centre in a technical secondary school in Livorno in co-operation with the local authorities of the Province of Livorno - including a very modern and sophisticated network system of video-conferencing and e-mail learning all over Tuscany.
- Dissemination of activities on a regional as well as national level to present the model of the action research group in the region of Livorno as a necessary precondition for the successful introduction of ODL on the upper secondary level in adult education.

In conclusion we can say that the Italian partner has made an enormous progress in implementing ODL structures within the one and a half year since the beginning of the project. However, this example does not only show that people who are very persevering and initiative are absolutely necessary, but also institutional support and the co-operation and backing regional and local authorities. In addition, this example shows how the AEN project contributed to the activities and supported the initial ideas which already existed.

Centro Naval de Ensino a Distancia - Portuguese Navy - Lisboa / PT

As opposed to the Italian partner, CNED Lisboa could rely on an existing infrastructure for the development of distance learning material, a trained staff and experience in distance learning, although mainly based on paper and printed material at the beginning of the AEN partnership. Moreover, the technical equipment for the production of video, audio and electronic learning material is fully available in the centre. Nevertheless, teachers appeared to be rather hesitating or not very enthusiastic to change to electronic learning platforms.

Therefore the centre worked out a plan and strategy to develop an ICT teachers training programme in the use of an electronic learning management system and started intensive teacher training courses. Moreover students were invited to enrol in this electronic learning platform (FORMARE), which is used and tested by CNED in co-operation with the Portuguese Telecom. The FORMARE Platform will be presented to the whole AEN consortium at the final workshop in Hungary.

CNED established a tutoring system and designed a data base (ORACLE) for the management of all secondary level courses. The Portuguese partner made the experience that the adult learners at a distance who enrolled in the electronic learning platform, needed intensive coaching and tutoring by the teachers. Regular Email exchange was also established by tutors and students on ships.

In order to ensure the quality of the electronic learning material developed in the centre CNED started a co-operation with the second Portuguese AEN Partner, the Instituto Technico Superior of Lisbon University, which evaluates CNED's multimedia products. In addition CNED also started in-service training courses for teachers for the provision and creation of content for electronic learning material.

CNED predominantly used the AEN partnership as a platform for the exchange of experience and examples of good practice in order to transfer this experience on a national level, e.g. to contribute to restructuring the Navy's training system in a network.

The example of the CNED can show, how a basically experienced partner has used the AEN project as a kick-off for new orientations and activities.

Komvux Vänersborg - SSVH Härnösand / SE

Komvux Vänersborg is an education and training centre by the municipality of Vänersborg with a tradition in adult education and distance courses since 1996. The orientation towards the electronic learning platform First Class started with the beginning of Komvux' participation in the AEN project in 1998/99. The adult learners appreciate the program because of its user-friendliness.

Komvux relies on support by an IT expert from the nearby University of Trollhättan and the IT co-ordinator of the local authority. Furthermore, Komvux established a co-operation with SSVH Härnösand, the National Institute for Distance Education in Sweden, which is also partner in the AEN project. SSVH developed teacher training courses tailor-made for Komvux teachers who took over distance courses based on an electronic learning environment.

In the meantime Komvux offers its experience to further education centres in the south of Sweden, in particular in teacher training, in order to establish a network of institutions working in the field of ODL.

Apart from all the other activities carried out in the project the results mentioned above are examples for co-operation on a national and regional level and show the trickle-down effect from the exchange of experience on the European level and its impact on the further development on a national basis. Apparently, the transfer onto a national level is one of the most important activities caused by the participation in an EU-project.

European Educational Policy and Contributions of the AEN project

In the first place, European Educational Policy focuses to the conception of lifelong learning to an enormously large extent. Its latest messages stress the acquisition of new basic qualifications and the importance of effective teaching and learning even more. ICT in teaching and learning are regarded as an important contribution to the efficiency of knowledge acquisition.

It is not surprising that the e-learning initiatives undertaken by the European Union are motivated by the weaknesses and shortfalls in the new information and communication technologies European countries have in comparison to the USA. Moreover, the current shortage of qualified staff can also be regarded as a major reason for the emphasis on education and training in new technologies. Teachers who have real skills in ICT and can incorporate them in their work still seem to be a minority. Undoubtedly, European countries are characterised by an increasing lack of IT-experts. Estimates vary from 1,2 million jobs to about 1,6 m. The gap between Europe and the USA in this field seems to widen. E-business is considered to be the driving force behind the economic boom in the US. Europe has to struggle hard not to lose even more ground in the digital economy.

The e-learning initiative by the European Union therefore formulated very ambitious objectives for Europe concerning the technological infrastructures, an increase of people's knowledge in ICT and objectives for adapting education and training systems to the knowledge-based society. Teacher training is regarded to be very essential.

These facts as such are not so surprising. It's the tight schedule for these activities that makes one wonder if these targets can be realised till the end of the year 2002.

The results of the Socrates-ODL-Project "Adult Education Network" fit perfectly to the latest EU-initiative on "E-Europe". While questions of equipment and curricula are subject of national educational policies and while IT-certificates rather need organisational backing, the AEN-Project addresses the important issue of the development of web-based learning material and Internet supported co-operative learning organisation as well as teacher training in ICT.

The Feira-demands for Internet-services, web-based teaching and learning material organised in electronic learning environments are most difficult to realise. According to these demands authors should be experts for content development and web-presentation although experience with online-learning is scarce, particularly off the university campus.

Nevertheless, the objectives and demands are a challenge and the AEN project tries to contribute to the implementation by the Member States. In Austria, e.g., the AEN project contributes to the organisation of teacher training courses in multimedia content creation and provision. In general it can be said that projects funded by the European Union should be more integrated in national policies as they can offer international experience and different orientations.

SOCRATES / MINERVA - critical remarks

Undoubtedly, European funding is an important contribution to foster the implementation development of ODL in education. However, the Socrates funds can only be regarded as a small contribution to kick-off activities, in particular because investment in technology, education and training is always very costly. The partners' own resources will therefore be insufficient in many cases and national co-financing and active subsidy as a part of national government strategies appear to be inevitable to increase the efficiency of the work being done in those projects.

Networking and Co-operation in Europe

As it has already been pointed out, networking and co-operation of educational institutions in Europe are an absolute necessity to implement the demand for enabling the people to become digitally literate. A concentration on the practical work, which is also one of the major assets of the AEN project, and strengthening the synergy of all players in the field of ICT is a further must to accelerate the development towards a digital culture in the knowledge society. In particular, we feel that the integration of economic players is of utmost importance and the co-operation with educational institutions and companies in business and industry will enable educational institutions to increase their efficiency considerably.

Therefore it should be pointed out clearly that it is them who can actively bridge the gap between those who have access to new technologies and those who are excluded from the knowledge society.

Sustainability - further projects and development

Although the AEN project has to be brought to an end in autumn 2001 the experience and knowledge acquired in the field of ODL should be developed further and made available in an even bigger network. Currently first ideas are being developed concerning the continuation of activities on a European level. Our particular interest focuses on a European Network of adult education institutions with experience in open and distance learning - practical work and experience should be at the core of a future project. Anyone interested in such a network is kindly invited to contact the co-ordinators of the AEN project.

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INTERN: PROMOTING ADVANCES IN EUROPEAN HIGHER BUSINESS EDUCATION THROUGH ICT – SUPPORTED VIRTUAL INTERNSHIPS

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Introduction

Many Higher Educational Institutions report a significantly increased demand from both students and companies for some form of international internship within courses established as full time study programmes. Such internships can make an important contribution towards an improvement in the quality and relevance of a student's business education. However access to such internships requires both flexibility and the allocation of considerable resources on the part of Higher Educational Institutions, companies and, in particular, students which means that only a limited number of programme participants can avail of such opportunities. The INTERN project demonstrates the approach being taken by a group of European business colleges to find a new way to meet these demands for Internships.

INTERN

The INTERN project supported by the Socrates/Minerva programme (2000-2002) represents an innovative way to create Internships in Higher Education by exploring the extent to which Information and Communication Technologies (ICTs) can support a system of Virtual Internship. This will enable Higher Educational institutions to provide an environment for their students where they can work together to solve problems and carry out work for companies based in other European countries. The partners in INTERN are the following:

- Tietgen Business College, Denmark,
- Buskerud College of Further Education, Norway
- Arcada Polytechnic, Finland
- Institut de Formation Internationale, Rouen, France

Each of these institutes is an experienced Higher Educational Institution with a range of skills and know-how and a detailed understanding of the particular educational needs of business in their own country. They each bring to the project links with local business, small, medium and large companies and networks (e.g. chambers of commerce) where traditionally many of their business students have worked as interns in traditional placements. This traditional internship has been an important part of the overall course taken by such students.

Project Activities

The project which began in September 2000 and which will last till February 2002 involves a number of steps:

Research: in order to ensure that INTERN integrates and applies relevant knowledge from national and international sources, the first part of the project has focussed on a analysis of the current situation in Europe regarding internships fro business students generally. This research has in turn informed the partners on the final technological, co-operational and pedagogical platform to be used for the pilot projects

ICT- Supported platform: At the same time as the partners have been investigating the current situation regarding internships in Europe, a comprehensive action has also taken place whereby a common ICT platform has been agreed. This involved the partners agreeing a base-line set of technologies to be used to support of the Virtual Internships. These technologies are desk-top vide Conferencing and audioconferencing for synchronous communication, a comprehensive web-site with public and private areas whereby small teams can share resources and coollaborate on the creation of documentation and a

simple collaborative communications system allowing for asynchronous communication on a one-to-one or one-to-many basis.

Pilot Virtual Internships: These will take place from June until December 2001 and they will enable students in each of the institutions participate in virtual internship projects for international companies. It will also provide the opportunity for close co-operation with companies and students from Higher Educational Institutions in other European countries. This will enable Higher Educational institutions to provide an environment for their students where they can work together to solve problems and carry out work for companies based in other European countries. These assignments will also take place in a supervised and relevant Action Learning environment where the emphasis will be firmly placed on the learning opportunity. Examples of the kinds of activities envisaged by the INTERN project consortium include:

- Marketing surveys for companies in other countries using information technology e.g.: Students from France and Denmark conduct a marketing survey for a Danish company situated in Finland which wants to export to France
- Research including store checks, e.g. Students from Norway and Denmark work together on a store check in the two countries for a French company
- Students from France and Norway work together on logistical research in their two countries for a Norwegian company.

These Virtual Internships will be fully evaluated from a number of different points of view and will probe the success of this approach with all stakeholders including the students themselves.

Best Practice Manual: Throughout the project the partners are taking care to disseminate information about this approach to those involved in business education in Europe and others interested in the principle of Virtual Internships. At the same time the partners are collecting all the relevant documentation, research findings, evaluation results and guidelines available which will have contributed to the realisation of these virtual internship project. This will result in the establishment of a body of information as to how ICT's can be successfully used to support Virtual Internship in order to create a 'Best Practice' manual which will be published in the final months of the project.

Outcomes

INTERN also gives a practical preparation of the students for new job situations where working at home, video conferencing, use of the internet or intranet etc. will be a natural part of the culture of the future labour market. At the same time INTERN allows Higher Education Colleges a unique opportunity to prepare students to be a part of companies established in smaller independent units and linked to each other across borders using Information and Communication technology.

Students will also be prepared for various developments in the labour market and they will be able to solve work assignments in connection with a company in another country. Through this experience the students gain practical knowledge in a cost efficient way.

In INTERN models will be constructed which will allow the various Virtual Internship assignments to be integrated with theoretical teaching. This will enable staff in the various other Higher Educational Institutions taking part to explore the increased role Information and Communication Technology is playing in business today and generally combine theory and practice.

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NETWORK SOLUTIONS : ENHANCING INTERNATIONAL CO-OPERATION

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Introduction

Many initiatives have been taken and are continuing where the central concern is the application of open and distance learning technologies to the actual classroom experience. These range from the highly specialised virtual campus style universities to the individual teacher within the conventional institution using a technological platform such as WebCT to supplement his/her teaching. The level of support offered varies as does the degree of interaction and indeed the prerequisite IT skills and access to technology of the learner.

It was against this background of evolving use of technologies to enhance and facilitate the actual learning process, and by learning from some of the outcomes already available from earlier initiatives that a number of higher education institutions began adapting these outcomes to the area of trans-national or international co-operation.

International co-operation between Higher Education institutions has been for long a worthwhile if sometimes elusive goal. The opportunities offered and pioneered by ODL in the area of conventional classroom teaching seemed a rich source for application to the realm of international co-operation.

Background

It has become acceptable for students to take some elements of their higher education using an ODL approach, yet where Distance was a key factor ie international co-operation, this approach was largely underdeveloped or at best underutilised. ODL made its first official appearance in the community educational programme Socrates in 1995, building on the 1991 Memorandum on Open and Distance Learning in the European Community. Despite this, physical student mobility was poorly serviced even at an informational level using ODL/ICT.

One may wonder why such a state of affairs existed and a possible explanation may lay in the structure of International Offices within HE institutions. Many International Offices are seen as servicing academic departments and are staffed by administrative personnel who have no ownership of the study programmes which they promote and who lack the resources to apply new technologies. This is beginning to change as institutions come to realise that international co-operation is no longer a nice addition in promotional material but an integral part of the learning experience for students which may also offer significant market potential.

International co-operation may take many forms but if one considers it from the mobile student point of view, it is here that the greatest advances may be made in the application of web based technologies. A student who wishes to study abroad for a semester is faced with many options and even more questions : Where can I go ? What can I study ? At what level ? Are there prerequisites ? Will it be recognised ? Is there a language competence required ? How much will it cost ? How do I find accommodation ? What are the exact dates ? What format does assessment take ? How can I keep in contact with my home institution ?

In the conventional scenario, a student would attempt to answer these questions by contacting the International Office and academic staff of the home institution as a first port of call and subsequently the same functions in the potential host institution if possible. Printed material would probably be available in the home institution if co-operation already existed between both institutions. By its nature printed material tends to date fast and timing is a crucial factor. The student would be interacting with services which are often under resourced or understaffed.

Birth of Project

In 1998 a group of seven Higher Education institutions got together in a Socrates ODL project “Network based learning in Project Group Environment” Socrates ODL Project Reference : 56607-CP-1-98-FI-ODL-ODL. The project objective was “to test working methods in practice and evaluate how academic institutions can gain from using computer networks in learning processes and everyday communications”. The project co-ordinator is EVTEK Mercuria Business School, Finland and the web site is <http://virtual.mbs.fi/virtual>

Within the umbrella project of seven partners, a subgroup of three leader institutions (Mercuria Business School, Universita di Genova, Institute of Technology, Tralee) concentrated on the application of network and web based technology to international co-operation. All three had significant experience in student and staff mobility and were also involved in CD and other international projects using more conventional co-operation tools. Under Socrates II, the Minerva action seeks to promote European co-operation in the field of ODL and ICT in education. Its definition for ODL in higher education “ODL involves the use of new methods (both technical and otherwise) to improve the flexibility of learning in terms of space, time, choice of content, teaching resources, and/or to improve access to educational systems from a distance” may be considered as the working definition to which the International Co-operation project partners subscribe.

The challenge was to harness what had been developed as a learning tool in online course development in order to facilitate international co-operation. The initial objective in year one was to create a more open, accessible and flexible information source which would facilitate student and staff mobility and increase exchange of course information. This stage involved the building up of a knowledge base on international study options by the three partners which would later be disseminated to all partners.

The Trans-national Co-operation Project stemmed from a need to make better use of new and innovative internet based technology to manage the growing numbers of international partners, student and staff mobility flows and project participation. The goals set were the effective dissemination of information, increasing student and staff mobility and paralleling and replacing existing paper based systems. The process was designed to maximise throughput, effectively use the resources and technology becoming available, simplify student access and increase individual autonomy.

Project Implementation

The first step was to do an audit of present needs and based on that a list of priorities was drawn up. This example will concentrate on project work done in IT Tralee. This included updating the International section of ITT’s home page, establishing new live links between home page and partners, making available online information on courses (ECTS) and practical information for students. Next, online application and registration forms were put on the home page for electronic transmission.

The information was written and collated by the International Office. Exchange students specialising in IT on a work experience placement in Tralee, did most of the web based work and data insertion. The students were given credit for their work on the production of a technical report for the home university. The International Office liased with other Institute departments and functions. Resources included staff and student time, use of the Adobe Suite, a digital camera, server space, PC access, technical support, academic supervision, office space.

Although much of this work was descriptive and informational, it was the key to further developments in international co-operation activities. The possibility for a student to access personally meaningful and useful knowledge in an effective and efficient way was seen as a prerequisite to a successful study period abroad.

The Autumn 2000 semester saw the first international students who used this online facility enrol in IT Tralee. The following information was available online specifically for international students with links to appropriate services and information sources under “International” at www.ittralee.ie

- Subjects and ECTS credits
- Knowledge of English

- How to apply (online Application form, Confirmation form, Online Subject Form)
- Important dates
- Getting to Tralee
- Cost of living
- Accommodation
- Things to bring

Links were created to other more general student information as follows.

- Student Services
- Life in Tralee & Kerry
- Sports
- Library
- Computing

Parallel to this, an email group was set up for all International Students to facilitate communication.

Project Structure

The International Co-operation Project was co-ordinated by MBS International and the partners were Univesita di Genova, Italy and the Institute of Technology, Tralee, Ireland . Although much of the work was done independently by partners for mainly logistic and practical reasons, the initial input and sharing of ideas at workshops and seminars was essential. Partners were able to view each others progress through the internet and also via both informal contacts and regular reporting to the overall ODL Project Co-ordinator. (<http://www.mbs.fi/english/polytechnic>), (<http://virtual.mbs.fi/studentinfo>) (http://virtual.mbs.fi/odlprocess/unige/ultimo_odl/eng/index.htm) The project kick off took the form of an intensive training week at EVTEK MBS Finland in autumn 1998. This was followed by another intensive training week in Hogeschool Holland, Diemen, Netherlands in autumn 1999 (<http://www.hhit.hsholland.nl/odl>) Co-ordinator meetings and seminars have been held throughout the 3 year period although email appears to be the main communication tool used despite the elaboration of a WebCT platform.

Evaluation

Informal assessment and evaluation was carried out during web site creation. The work was assessed internally by teaching staff in the Computing Department. The overall project had an external assessor report. The main end user evaluation was done in September 2000 during project year two. 55 incoming international students who had used the online system completed a Questionnaire. The evaluation results are attached.(appendix) 80 international students arrived in IT Tralee for the Autumn semester in September 2000. Of these 66 exclusively used the online application procedure. However only 55 returned the evaluation questionnaire. The majority of these students study Business and Social Studies and the web site information is of most relevance to them. In the future the information will be extended to cover other subject areas in more detail.

From a student satisfaction point of view the results are encouraging with 48 out of 55 respondents considering the web based information good or excellent. 44 out of 55 also prefer the online electronic application procedure as opposed to 7 who would prefer a paper version while 4 had no preference. (appendix) An 82% web based completion rate was achieved in the autumn 2000 semester while almost 100% completion has been attained in the spring 2000 and autumn 2001 semesters.

In summer 2001, it is planned to again update the existing web site and add an e mail Evaluation Questionnaire and also activate a counter hit. Students may access the site for information without completing the online forms or requesting further information. The counter will give quantitative feedback. Suggestions from the September 2000 evaluation will be incorporated.

Problems encountered

- a) Timescale
By its nature the provision of online information six months before the start of semester presumes that such information is readily available. This is not always the case and changes have to be made at a later date. A culture change is required by management and administration in education in order to avail fully of the opportunities provided by web based information.
- b) Student culture
Many students did not take the time to read and study the online information but preferred to use the email function to seek information.
- c) Updating
Updating of information on a regular basis is essential. At present a number of options including student work experience are being considered.
- d) Attitudes to ODL /ICT vary in different cultures and further study of this is required if effective communication is to be achieved using these technologies
- e) Socio-economic disadvantage

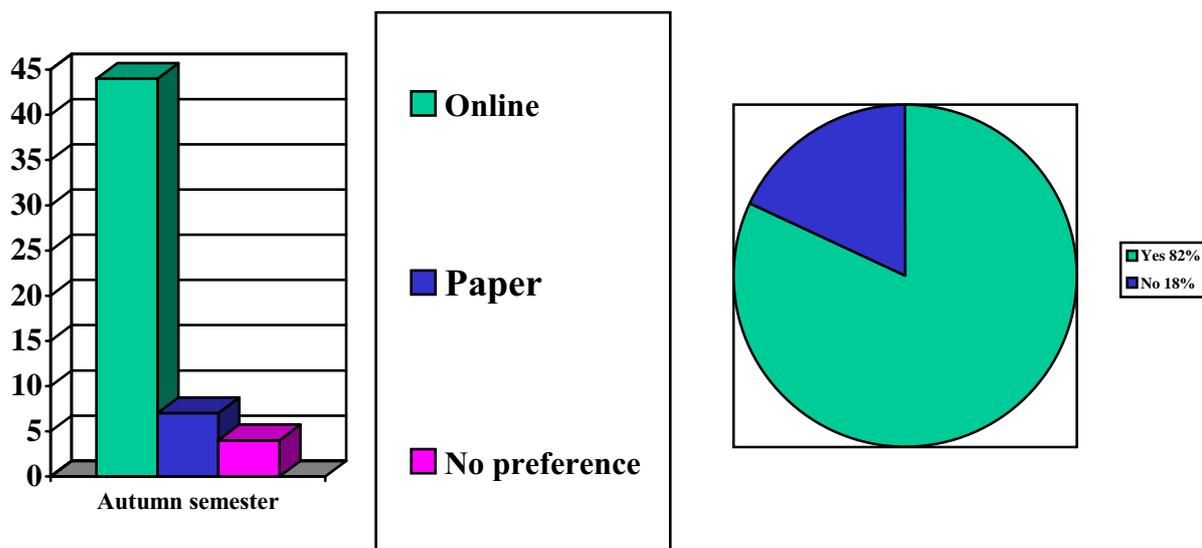
“The virtual campus may widen opportunities for some, but not by and large for those at the low end of the socio-economic scale who have traditionally been underrepresented in HE. Virtual space is infinite but it does not promise universality or equality”(1). One should remain conscious that a consequence of totally web based or web dependent systems may be to exclude those who either have no easy access to the technology or have not mastered the initial technology for whatever reason.

Application of outcomes

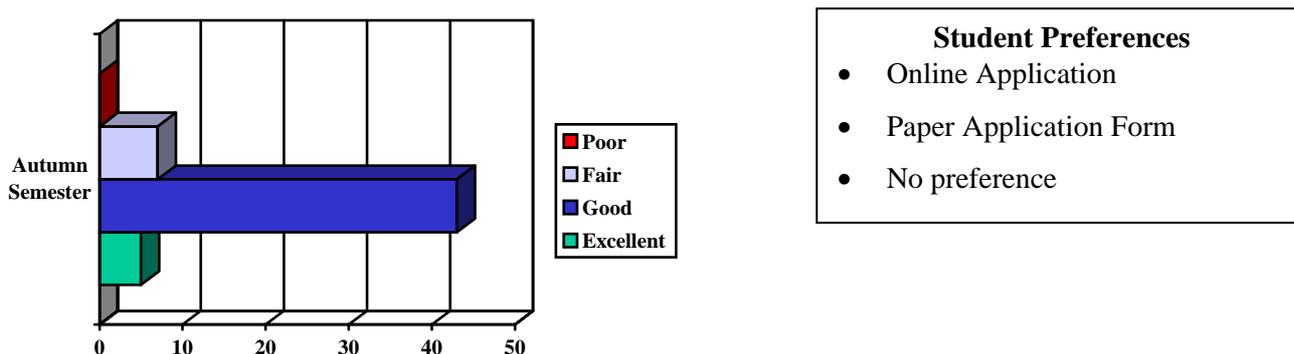
The project is currently in year 3 and the main objective is dissemination of the results, experience and outcomes. While this paper has focussed on the advantages of a web based system for student mobility, similar advantages can be imagined for staff mobility, participation in Curriculum Development activities, joint and intensive programmes where preparation and follow up could be web based. These initiatives generally fall outside the confines of conventional classroom activities. The preparation, supervision and follow up of student placement abroad lends itself readily to network based technologies as does supervision of dissertations at a distance. The addition of interactive features such as chat groups, web ring, authoring tools, real time communication and the possibility of collaborative project learning can make international co-operation more real to a greater number of people.

From the International Office manager viewpoint, the initial investment of time and resources required to put in place a web based information system is significant and regular updates are essential. The advantages however are many. If recruitment of an international student base is an objective, the opportunities are obvious. If servicing regular student/staff mobility under EU or other programmes, long term time saving is achieved through linkages to sites which themselves are updated regularly. Student autonomy is promoted and better time management can be achieved. The challenges should not be underestimated but by sharing the same information environment, international co-operation can only be enhanced.

Appendix
Online Application Form Completion Rate



Student Rating of IT Tralee International Web Page



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IMFUNDO: PARTNERSHIP FOR IT IN EDUCATION

Janet Jenkins

Imfundo: (*im~fun~doe*) *n.* The acquisition of knowledge; the process of becoming educated. (from the Ndebele language, spoken in parts of Zimbabwe and South Africa)

The single most important change that is needed to hasten economic development in poor countries is to expand educational opportunity. Over 100 million children in developing countries do not go to school. Of those who do, many do not get an adequate education, and many leave school functionally illiterate. There are not enough teachers, and many teachers do not have sufficient training. Poor educational opportunity consigns successive generations of young people to a life of illiteracy, reduced life chances and low employability.

Imfundo: Partnership for IT in Education is a new initiative dedicated to finding the best ways of using information and communication technology (ICT) to increase access to and improve the quality of education in poor countries. In March 2000, British Prime Minister Tony Blair launched the initiative with John Chambers, Chief Executive of the ICT company Cisco Systems. A public-private sector team including officials from the UK Department for International Development (DFID) and secondees from three leading companies, Virgin, Marconi and Cisco Systems was formed to examine the use of ICT in education. The team had a particular focus on sub-Saharan Africa where the crisis in education is most severe. The team arrived at two important conclusions:

- ICT could be used effectively for teacher training and to improve management of the education sector.
- there is a much willingness within the private sector to use some of their expertise and resources to help improve education.

The Imfundo project has now been established for an initial 5 years, with a small team operating from the Africa policy and economics department of DFID. This reflects a decision to concentrate initially, but not exclusively, on Sub-Saharan Africa. Imfundo's role will be to bring together African partners, other donors, and business and technology partners across the world to bring about change in African education.

Imfundo aims to become a resource centre which will work its partners to develop strategies to improve education in developing countries supported by ICT. "ICT" is interpreted broadly, to include radio, tape cassettes, television, video, satellite, computers, CD-ROMs, and the Internet. To start with, it will focus on improving teacher training and education sector management.

Imfundo's objectives are challenging because we are trying to improve education - so crucial to development - in new ways. We believe there is great potential value in finding ways to harness technology and the resources of the private sector to provide more and better education in poor countries.

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FROM DISTANCE EDUCATION TO ONLINE LEARNING: FORMATIVE ASSESSMENT IN HIGHER EDUCATION

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Introduction

Higher Education is changing. There are:

- changes in staff-student ratios
- decreasing student/teacher ratio
- changes in student profiles
- decreasing economic resources
- increasing demand
- political aspirations to increase participation
- changes in student roles (encouraging flexible learning)
- communication media to enable students to learn at a distance or asynchronously
- tools which can take over mechanical tasks and free up time for students to develop higher level skills
- changes from distance education to online learning
- debates about summative (high stakes) and formative (low stakes) assessment

In the 1930s and 1940s there were less than one percent of the Swedish population at universities and institutes of higher education. Directly after the Second World War there were about 14 000 students in the Swedish Universities. Subsequently, the universities in Sweden has been extended to give further possibilities for higher education. In the beginning of 1990s there were more than 200 000 students (Sörlin & Törnqvist, 2000). During the 1990s the number of students in higher education has increased by more than 50 percent. During the academic year 1998/99 there were more than 300 000 students (Högskoleverket, 1999), and 50 000 employees (SCB, 1999). In Swedish higher education instruction should build on a foundation of science and be conducted by teachers who hold a doctorate. The level of teaching that met this requirement during 1999 was 55 percent (Högskoleverket, 1999). During the period 1989/90 – 1997/98, however, universities student/teacher ratios increased from 10:1 to 15:1 (Westling m.fl. 1999). Whereas the number of students during the period increased by 86 percent, the number of teachers/researchers increased by only 17 percent (Riksdagens revisorer, 2000). The character of the universities has changed from elite to mass institution during the second half of the 1900s.

Consequences for teaching and learning

Such expansion has changed the working patterns in universities. Students are taught in lecture halls with up to 250 students in each group, such that the possibility to ask questions is limited (Brownson, 2000).

Research shows that all learning demand thinking and active construction and development of mental models.

From today's cognitive perspective, meaningful learning is reflective, constructive, and self-regulated. People are seen not as mere recorders of factual information but as creators of their own unique knowledge structures (Miller, 1999).

It is time to move the emphasis from teaching to learning (Harvey, 1997).

How can resources be reallocated to allows for learning? Use of e-learning, for example, is one solution that is widely promoted. It is claimed to be 50 - 90 percent cheaper than using real-life teachers and

holding formal classes (Svetcov, 2000). Maise (2000), however, suggests that the key to success is to find the right mix between online learning and classroom based instruction.

Research shows that there are now significant differences in the ability to learn with different technological tools. Carnevale (2001), however, claim that the media do not affect learning. The design of the instruction and partly what the students bring with to the instruction situation that affect learning. Online education does not differ significantly from traditional classroom-based education in respect of results and student satisfaction (Vachris, 1997) (Jones, 1997). Harvey (1997) claims that *the Web must be brought to life in an environment of cooperative learning*. In online courses students wish to have frequent feedback and interaction, particularly if they feel cut off from both teacher and classmates (Hoey, 1998). *People tend to lose interest if there's nobody on the other side who cares if I'm here or not*, (Svetcov, 2000). The best thing with online courses is that the students can work when they wish at their own pace and where they wish (Hoey, 1998).

Much attention give to ICT

Great expectations are tied to the new information and communication technology (ICT). Computers were, as late as 1985, used only by a little elite for word processing and simple calculation. Fifteen years later more than half of the Swedish people have access to the Internet (Sörlin & Törnqvist, 2000). In November 2000 more than four million person in Sweden between 12 to 79 year old surfed on the internet. 93 percent of the men in the group surfed some times during the month (Computer Sweden, 2000). Today students and teachers can communicate over the Internet with cheap cameras and microphones which gives interaction to every Internet connected computer (Blotzer, 2000). With access to video- and sound streaming the Internet will be the obvious choice within areas where there is access to computers (Dunn, 2000).

New possibilities (ICT), new alternatives

The transformation of higher education is becoming visible. One off the most important attributes is that the boundary between time and space is being eliminated. With asynchrony distribution on the Internet the same course can be taken in South Africa, Australia or in China. Students can receive credits from different parts of the world and send them to their 'home' university (Dunn, 2000).

Students will be able to shop around, taking a course from any institution that offers a good one. Degree-granting institutions will have to accommodate this. Students will learn what they want to learn rather than what some faculty committee decided was the best political compromise (Svetcov, 2000).

Many of today's universities, especially in the United States, will be examining and accrediting universities. The Association of Governing Boards in the United States predict that one third of the existing independent schools and universities will close within the nearest 10 years. Yet, as the numbers of traditional universities decline, the number of those who offer higher education will increase. Publishers, companies, and commercial and non-commercial organizations will share the education trade. These actors will sell courses direct to the students and eliminate the universities as a middleman. The future virtual universities will not be an individual institution, but a gateway for an education organizer who will collectively distribute customised education to students in a time and place. It is claimed that this will be the dominant form of higher education in 2025 (Dunn, 2000).

Supporting learning rather than selection

The increasing numbers of students makes it difficult for teachers to mark and return individual feedback to the students. The use of formative online assessment, however, allows students to test out their knowledge and get immediate feedback. However there is a danger that the students look at the result and the feedback as a confirmation of their adequate understanding than like a way to discover areas of their weakness (Judge, 1999).

How can we use information technology to transfer learning? Teachers can use systems that provide them with tools for analysing and tracking students responses. Teachers can use it for helping students with problems or identifying questions that are more or less bad. The strength with this tool is that it can promote students learning.

There is an ongoing discussion about learning, just as there are competing theories of learning. Methods of assessment are also determined by our beliefs about learning. In this paper we suggest that assessment can support learning as well as measure learning through internet based processes. An important purpose of using online assessment is the possibility of giving students immediate feedback on their understanding of course material (Judge, 1999). It is important that the student feedback is of a high quality to enhance the learning process. The students need not only feedback on how well they have done but also on what they haven't understood and help to improve their understanding (Ramsden, 1992).

The use of online assessment has the advantage of enabling student responses to be marked and analysed with relative ease and speed. Properly designed online assessment allows students to test their knowledge of a topic and get immediate feedback. Important questions remain about how and whether students organize, structure, and use this information in context to solve complex problems (Miller, 1999).

Low versus high-stakes assessment

When assessment is used for high-stake purposes, it must meet high standards of reliability and validity. When tests are used for low-stakes assessment, the teacher considers many pieces of information when making decisions about students, testing standards can be a bit more relaxed (What is a test, 1997). High-stakes testing programs frequently result in improved test score, but such improvement does not necessarily imply a rise in the quality of education or a better educated student population (Moss, 1992). Test security is also an important issue in all high-stake assessment. This is not a problem in low-stake assessment. Low-stake online assessment can be offered to the students at the place and time that is convenient for them. Students can be assessed at their desks or from their portables over a mobile phone line. It is not necessary to drag students into the classroom just to assess them. Less time and money wasted on travel to the assessment centre (Kleeman, 1998).

Are online students as qualified as campus students? Online students have showed they are equal successful (Smeaton, 1999) ore more successful measured in terms of examination results (Redding, 2000). Other studies shows that online students could perform at least as good as traditional students (Dutton, 1999). Another study has shown that the performance of students examined in Internet based items was statistical significant higher then in the campusbased items (Fredda, 2000). Jon Losak, vice president in research and planning at Nova Southeastern University at Fort Lauderdale has come to the same result. During the sex last years have his institution carried out more than 24 studies comparing online students performance with their classroom counterparts. They analyzed among other things frequency of graduation, time to graduation and knowledge acquisition. The students performed as well or better in online courses (Caudron, 2001). Thomas Russell, at North Carolina State University, has catalogued 365 studies addressing this specific question. He concludes that there were no significant difference in academic outcomes between the two groups (Russell, 2000).

Need for exploration of these new possibilities and contexts

The new information and communication technology offer possibilities for new learning and assessment mode. One of the most important advantages with online assessment is the function as an aid for the students learning. The students can be offered assessment independent time and place and the teacher can integrate multimedia, simulation and graphics into the assessment. Another advantage with online assessment is saving in time and costs. In times with an increasing number off students and decreasing resources for teacher jobs means quicker amending and immediate feedback a better economical resource exploiting and that the teacher can mind more off the time for tutoring the students. Therefore it is important that the new technology is made feasible for interested teachers. However the question must be asked how this form of assessment affects learning and the quality of the education. Research about effects and use of online assessment assists the development and implementation of new forms of assessment. An interaction between pedagogical research and practical development of online assessment is therefore important. The general aim of the project discussed in this paper was to explore the application of these ideas to teaching and learning in higher education.

The Project

The project has been implemented with support from the Swedish Agency for Distance Education (Distum) and involves teachers and students from Department of Radiation Sciences at Umeå University. In common with other departments, Department of Radiation Science are constantly monitoring good practice in teaching and learning, and seeking innovative ways to improve the learning opportunities offered to students. It was in this climate it was decided to pilot online assessment during four weeks of a distance course in Medical Technology. The course aim was to introduce *Medical Technology* through an outline of different approaches and technical aids within medical diagnostics, treatment and evaluation. The name of the online section was *Bio potentials* which treated origins and transmission in humans, measurement of bio potentials and their medical benefits. The course target group was 20 online students of nursing/care in the Medical Technology field.

Activities

Training of the teachers comprised four seminars about question construction validity/reliability, and different assessment methods. Software training was covered in a one day of workshop.

The student assessment partly comprised individual-assessment and partly self-assessment. The individual-assessment assignment was to produce a poster to be presented on the web. The self-assessment used an online question database that the students accessed over a period of two weeks.

Early in the project a pre-questionnaire was filled in by the teachers in the course to gather teachers view of assessment in generally and online assessment. Since questionnaires can be limited, a structured pre-interview was held with the teachers. After the assessment period, and at the end of the course, a post-questionnaire was circulated and post-interviews were conducted.

To get the student view of using online assessment a questionnaire was distributed. The response rate was 85 percent. The data was collected between December 2000 to April 2001.

Outcome

The teachers view was that:

- online assessment was positive and that they would do it again
- online assessment was time-saving
- online assessment afford an ample statistical analyses of the assessment questions
- online assessment empowered generating of a couple of reports for analyse of the students performance
- online assessment could be to significantly help in learning and rehearsal
- online assessment make it possible for teachers/tutors to afford more feedback than it would be possible with paper based assessment
- online assessment increase the pace of result feedback and comments to the students
- an important advantage with online assessment is that the students can work at their own rate and as often they need

The Student view was that:

- online assessment gave possibilities for quick feedback
- online assessment was a good support for learning
- a big advantage with online assessment was that they was allowed to take the time they needed for the assessment
- online assessment had good access

- they saw many advantages with using internet in assessment
- they in the future would prefer online assessment over paper based assessment
- that they would be delighted to attend more courses with online assessment

Reflections

One of the most important advantages with online assessment is its function as an aid for the students learning. Another advantage is that the student can be offered assessment independent of time and place and that online assessment is time and cost saving. Therefore it is important that the new technology is made amenable and practical for interested teachers.

The first part in the assessment process, and the hardest, is to create the questions. It is important to think carefully about what it is students are required to know, and what common misconceptions there might be. The content validity in the assessment is very important and the teachers in the course were successful in that matter. The overall goal for the assessment was to enhance students learning. Most of the students also thought that they learnt a lot during the assessment.

Another important matter is what level of knowledge the assessment demand. An important goal for teachers is to enhance students higher level thinking. Therefore it is important that teachers have and take time to construct statements that demand students higher level thinking.

The most important thing for teacher is to have time to problemize the assessment concept and discuss with colleagues question construction, validity and reliability. Therefore, the project started with some discussion seminars where teachers could reflect together. Next the teachers were trained in the software package.

The biggest problem in the project however was not to train the teachers in handling the system but gaining access to the server. The university computer central had problems to get the server run.

All students in the course considered that the best thing with online assessment was that they could take the time they needed to realise the assessment. We have all different learning styles and it take different time for us to learn. Therefore it is important that the students can take the time they need to realize the assessment. The students would, if they could choose, have frequent assessments rather than a single assessment at the end of the course. That is a challenge for the teachers to meet the students' wishes in that way.

It is apparent that the students view is that formative online assessment affected their learning and that it attracts them to that degree that hardly any students wanted to go back to paper and pencil. It is apparent that the students view is that online assessment could increase flexible learning.

The innovation had an impact. The character of this impact can be seen in the students claim that they prefer online assessment before pencil and paper. What other effects the innovate had on the students styles of learning cannot be established from this research. In short, the introduction of online assessment has affected students learning, but analysis of qualitative changes in students learning must remain the focus of another study.

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MAKING THE MATCH BETWEEN ODL “PRODUCT” OFFERING AND TARGET AUDIENCE

László Komáromi SZÁMALK

Introduction

Powerful marketing is a tool to build learner satisfaction and obtain differential advantage over your competitors.

We are in business

We are in distance education business. We are involved in the business whether we write study materials, counsel students, administer course programmes or market potential courses of study.

While the state subsidised educational sector disburses money, those the business of distance education, usually have to earn their resources. The educational institution is to provide improved tuition, in wider range of subjects, they must be more money in the business. Everyone involved with marketing is involved seeing that this happens.

Doing good business should not be restricted to those who work in marketing, it should be the underling attitude of everyone. Marketing is not only a process of putting out well designed courses, promotional literature etc. It is dynamic process, constantly monitoring student response to improve the product, or modify it as the environmental changes. The distance educational course is one part of the product, the total service built around it (accompanying study guidance, advice, examination training, administration, etc.) form the other part.

That is why distance education is a business, why the marketing function so important.

The EduMarket project

The programme known as “*Application Marketing Methods and Tools in Life-Long Learning*” will be implemented within the framework of the SOCRATES GRUNTVIG programme by 4 European partners in cooperation:

- SZÁMALK Training and Consulting Centre (HU)
- University of Porto (PT)
- University of Strathclyde (UK)
- International Management Education of Marketing Institute (FI)

Aim and results of the project:

- Development of a *Practical Guide and multimedia CD* to focus on marketing for the institutions participating in adult education.
- Curriculum and ODL material development
- Organise distance educational *courses* for the participants of the certain target groups in order to disseminate the results of the project on a large scale.

The main elements of the Guide and CD as a results of the research analysis will be:

- definition of the participants of the adult educational market
- analysis of *learner profile*
- collective *segmentation* of the audience

- situation analysis to identify prospective *student needs* in today's competitive environment
- effective ways to *promote* older prospective students to take part in education
- *profiling* a marketing-focused adult educational institution
- *strategic enrolment* management and planning marketing lifelong education
- *diagnostic technique* for formulating marketing strategies in adult education based on relative competitive position
- development of a *strategic marketing model* for use by the institute for professional development, exploratory analysis of *lifestyle factors* affecting adult education participation of older adults
- means to *motivate* learner target groups
- marketing *communication means* towards the potential target groups of ODL and lifelong learning,
- *distribution channels* towards the potential learners
- *service quality* management
- pricing
- institutional image
- alumni relations.

The project will provide a ***practical tool*** for the educational institution in the field of *open and distance learning and adult education* in order to provide training programmes precisely meeting the needs of learners demands and those of the labour market.

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GLOBAL ASPECTS OF NEW FORMS OF LIFE LONG LEARNING

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1. Introduction

Nowadays society can be called as knowledge society in which information and knowledge are key resources to be used by anyone, anytime and anywhere. In the knowledge society education should be a continuous process that lasts through the whole life (Life Long Learning Process). Life Long Learning (LLL) comprises:

- initial education: primary, secondary and higher education;
- continuing education (knowledge updating): postgraduate studies, courses, workshops.

Continuing education may include attendance at “courses” and also professional learning outside formal educational systems. It is a bridge between individual’s private and employment-related worlds. Concept of correspondence study began over a century ago and remains popular today. The quick development of new communication and information technologies enabled the birth of new forms of Life Long Learning such as Computer Assisted Learning (learning by the use of a computer for study in self pace) and Interactive Distance Learning (a learning process, by the use of Internet, in which students and a teacher are not present at the same place). Life Long Learning must be planned in the context of evolving corporate and professional needs.

The following media are used for knowledge transfer in distance learning process:
text with graphics, audio, video, integrated multimedia.

The following models of a learning process, according to time and place, can be distinguished :

- the same time, the same place;
- the same time, different places;
- different times, the same place;
- different times, different places.

Educational system applied by the educational institution for Distance Learning shall ensure on-line courses and lectures, storage of data concerning courses, lectures and course participants, marketing of courses, statistics concerning courses and course participants, services for system users. Functions of such educational system may be specified taking into account types of users such as: students, lecturers, and administration staff and their privileges concerning their access to system data.

Life Long Learning can be considered in global dimension. Global aspects (concerning new forms of Life Long Learning) such as Global Information Infrastructure (GII) for education, use of Electronic Data Interchange (EDI) technology for education, Asynchronous Learning Networks (ALN) concept, standardization for education, methodology and tools for creation of distance courses were discussed in the paper.

2. Global Information Infrastructure

An appropriate Global Information Infrastructure (according to ITU Recommendation of Y series) is a base for global education. The information infrastructure of global nature enables full access to all types of information, their processing and exchange by anyone, anytime and anywhere.

It is possible to specify the following kinds of information infrastructure according to the area of its activity:

- Global Information Infrastructure (GII),
- Regional (e.g. European) Information Infrastructure (RII) and
- National Information Infrastructure (NII).

All National Information Infrastructures in one world region (e.g. Europe) form the appropriate Regional Information Infrastructure. All Regional Information Infrastructures form the Global Information Infrastructure. Information infrastructures must be mutually compatible. IT&T (Information Technology and Telecommunications) standardization at international, regional and national levels (mutually harmonized) is necessary for creation of such Global Information Infrastructure that comprises regional and national information infrastructures. It ensures compatibility of these information infrastructures at international, regional and national levels.

International Organizations for Standardization such as ISO/IEC and ITU are the main base for realization of GII idea. Some actions such as analyses and reports (prepared by the Bangemann's group for Europe Council and Benedetti's group for European Round Table) were undertaken for realization of GII concept at regional level (Europe). The European Information Infrastructure (EII) concept was defined (EII is an example of RII). EII should be compatible with GII (according to ITU Recommendations of Y series). European standardization bodies such as ETSI, CEN and CENELEC are the standardization base for EII realization. Standards for EII should be harmonized with standards for GII. Use and adaptation of international and regional standards of IT&T at national level is indispensable for creation of NII compatible with RII and GII.

Global Information Infrastructure should be based on interworking and interoperation of existing and future telecommunications networks. It involves the necessity to elaborate interface standards allowing interconnections between networks of different types. Now ATM – based B-ISDN is the most appropriate solution to achieve the interoperability between different networks. Other problems concerning creation of the universal Global Information Infrastructure are: exchange of different format information (it needs to create appropriate standards. Existing data formatting standards: UN/EDIFACT, ANSI X.12 for EDI may be used) and an appropriate protection of information within Global Information Infrastructure. It involves the necessity to elaborate and use appropriate regulations (e.g. for electronic transactions, electronic signatures) and standards (for security systems, electronic signatures, personal data protection). Creation of a supporting environment (that contains appropriate standards: interface standards, security standards) for Global Information Infrastructure is very needful.

GII should enable realization of Distance Education. Internet, because of its use on world-wide scale (Internet use is increasing exponentially worldwide) is one of GII components. Internet is very useful for education. It offers variety of tools for education such as: WWW, electronic mail, computer conferences (audio-conferences, videoconferences, chats), discussion fora, MOO (Multi user (domain) Object Oriented, gopher, BBS (Bulletin Board System), FTP (File Transfer Protocol), shared electronics whiteboards, electronic libraries. The Internet tools are of two kinds: synchronous (communication between users at the same time) and asynchronous (communication between users independent of time).

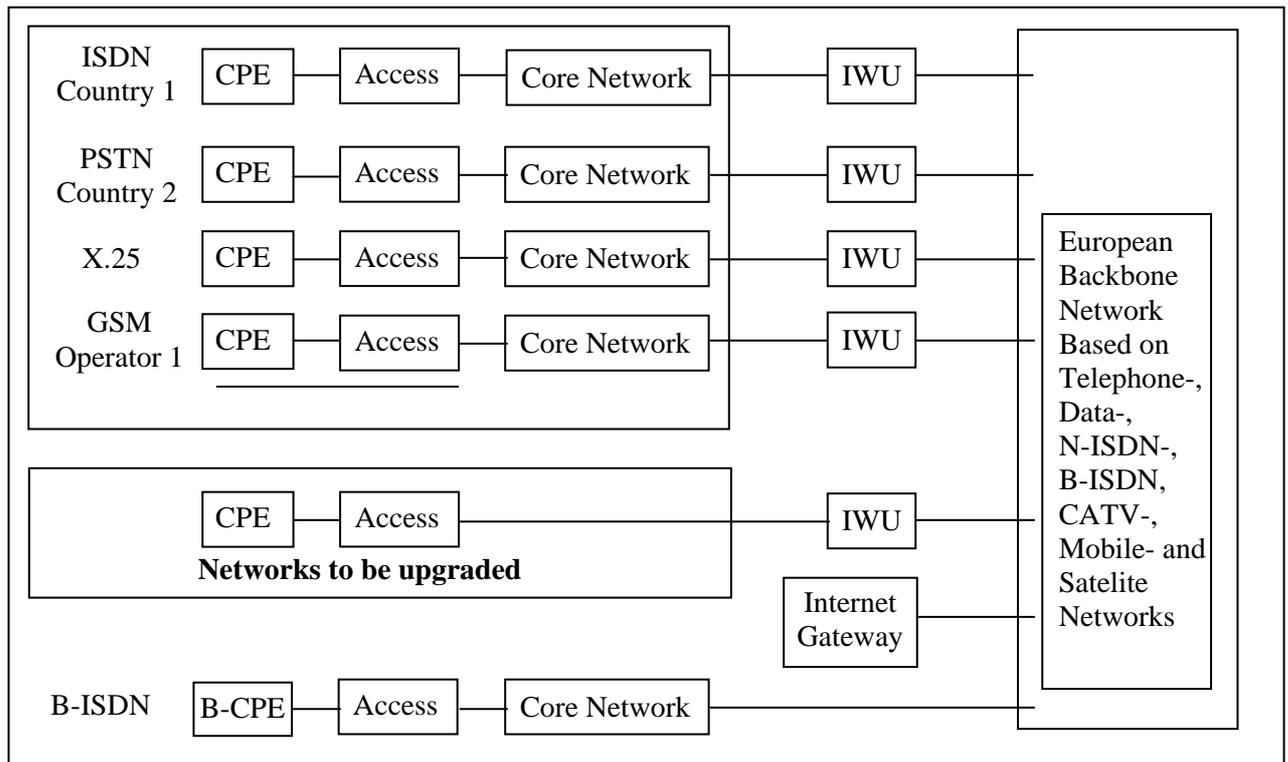


Figure 1. European Information Infrastructure concept

3. Electronic Data Interchange for Education

Electronic Data Interchange (EDI) can be defined as electronic interchange of documents (structured according to agreed standards) between computer applications via a transmission medium. The most popular international EDI data formatting standards (de jure) are UN/EDIFACT and ANSI X.12. EDI replaces traditional paper documents (kind of information carrier) by electronic documents. The use of EDI on world - wide scale will elasticize the whole system of information exchange.

EDI offers faster and more efficient ways of working. EDI is a technology for the future. It will enable realization of the idea: offices without people, by full automatization of all processes performed by people. Routine works based on algorithms with clear decision criteria will be done automatically without any people intervention (a computer with the help of EDI technology will perform these works). It plays an integration role in many fields. Many different specialists of law, economy, informatics and telecommunications must work together to realize EDI idea in practice.

EDI technology is also very useful for educational applications. Use of EDI technology for working out educational applications will ensure mutual compatibility of such applications at international, regional and national levels. There was a special project, funded by the Trade Electronic Data Interchange Systems (TEDIS) Programme of the Commission of the European Communities under title "Migration of Education Proprietary Standards to EDIFACT" (MEPS). It was headed by the UK EDI Association (EDIA) with the assistant of some other organizations. The main goals of MEPS Project are:

- to document the requirements of the Education community, in the form of UN/EDIFACT Standard Message proposals;
- to produce the necessary guides to assist users in the migration process to UN/EDIFACT;
- to established liason with suitable representatives of the education community in order to work towards the consistency of message standards in the Education community in the world.

Many education centres exchange documents electronically using different proprietary standards developed by the relevant organizations. Replacing proprietary standards for exchange of educational data with an international standard will engender several benefits. The creation and use of an accepted international standard will encourage more use of Electronic Data Interchange in Education. Participating

educational institution in each country will be able to simplify their administrative procedures as a result of using one single standard, and therefore will be able to allocate more resources to teaching.

The existing educational applications that exchange educational information are as follows: Course/Programme/ Module Base Data, Student Registration, Student Assessment, Student Awards, Student Education Records, Examination Entries. There are some messages (in the form of EDIFACT messages) which have been proposed within MEPS Project for education purposes: Programme-module Data (PRGDAT), Student Enrolment (ENROLM), Grades and marks from centre (SUBRES), Results (RESULT), Student Education Records (STUREC), Examination Entries (EXAMEN) (see Tab. 1).

4. Asynchronous Learning Networks

First ideas concerning the use of computer networks for education appeared in 1970 years, early implementations appeared in 1980 years. In 1993 the Alfred P. Sloan Foundation initiated a program on “Learning Outside the Classroom” and made grants to early adopters of Asynchronous Learning networks (ALN). ALNs are learning networks of global nature. Definition of ALN:

Asynchronous Learning Networks (ALN) are people networks for anytime, anywhere learning. ALN combines self-study with substantial, rapid, asynchronous interactivity with others. In ALN learners use computer and communications technologies to work with remote learning resources, including coaches and other learners, but without the requirement to be online at the same time. The most common ALN communication tool is the WWW.

ALNs may be used for learning in off-campus (very-far-from-campus or near campus) as well as on-campus education. ALN, according to the possibility of learning independently of time and place, are used in distance education. They are very useful for working adults because of the possibility to learn in asynchronous mode (learning possible anytime, anywhere). Use of Internet ensures access to the didactic materials (currently updated) for big number of learners. ALNs enable electronic registration, electronic handling of tasks, interactions between a student and a tutor or between students in asynchronous mode, group work, self paced learning, electronic exams. They may give possibility to use modern synchronous tools. They are very useful for disabled persons (enabling to avoid transportation difficulties) and in narrow specialities (it is easier to organize such courses for small number of specialists located in different places. Small groups of 3-5 persons geographically distributed, working together are called “distributed cohort groups”).

ALNs are used by Sloan ALN Consortium (association of accredited institutions of higher education offering ALN degree programs and certification courses through high-quality on-line education). ALNs enable to organize different forms of distance education: courses, workshops, postgraduate studies in many different fields such as philosophy and also engineering (through the use of telematics and multimedia tools e.g. simulation illustrating lectures, animations, distance laboratories). Educational program can be classified as ALN program under the following conditions (according to requirements in SLOAN-C Catalog):

Each course in an ALN program is instructorled and organized into learning cohorts. ALN program should not require physical presence on campus. An ALN program engages a distributed learning cohort. A key to ALN is people-to-people interaction. Program must include such interaction via an asynchronous medium. All courses in an ALN program should be accessible without special purpose equipment (other than a web-enabled computer and connection to the Internet (minimum telephone). ALN program must be available for registration and offer a degree or certificate.

ALNs can use intelligent agent techniques. The knowbots (knowledge robots) are intelligent software agents that automated the repetitive tasks of human facilitators thus ALNs are networks with intelligence. They give large possibilities for distance education by the use of the newest technological achievements.

Message Type	Name of Message	Message Function	Business Need
PRGDAT	Programme- module Data	To be used to establish basic programme data	A message linking qualification body to education centers and defining programme/module characteristics, registration options and assessment parameters
ENROLM	Student Enrolment	To be used for enrolling students	A message from a party (educational centre) providing sufficient information to allow the enrolment of a student with the party providing educational qualifications. This will allow the enrolment of students with an educational board and registration against programmes of study at all levels (e.g. course, unit, exam option, etc.).
SUBRES	Grades and marks from centre	To be used for reporting results and coursework marks	A message from a party (educational centre) providing information on marks or grades achieved by students on internally assessed parts of the course (e.g. coursework, internally marked exams, forecast results, etc.).
RESULT	Results	To be used for confirming results	A message from a party (vocational board) confirming the grades and marks received by students. This can be used to provide information on all levels of the programme (e.g. overall qualification grade, subject grade, units, coursework and individual exams).
STUREC	Student Education Records	To provide a record of a student's educational attainment	A message linking Secondary Education establishments with Higher Education establishments and Employer for validation of results.
EXAM .EN	Examination Entries	To notify examination entries	A message comprising entry applications made for various subjects and options by students in education centres for examinations offered by academic examination boards.

Tab. 1. Proposed new messages

5. Distance Learning Courses – practical experience

One area of National Institute of Telecommunications (NIT) where I work is preparation and delivery of courses, workshops and postgraduate studies by Training Center of NIT. Training Center offers courses and workshops in the field of modern telecommunications and informatics and postgraduate studies such as : management of telecommunications networks, radio-communications systems, multimedia telecommunications systems. It is a continuing education activity for adult engineers. NIT prepares to offer Distance Learning courses and postgraduate studies in asynchronous mode and hybrid mode. Last year I took part as a learner in Facile Pilot ODL course concerning Distance Learning. It was very useful and helpful to get practical experience in Distance Learning by the use of synchronous tools (chats, audio computer conferences) and asynchronous tools (discussion fora, e-mails). Practical experience is very useful to select appropriate technology and tools for particular ODL course.

Creation of ODL courses requires to identify purposeful and functional requirements. It guarantee to meet students requests. Following technologies are used in Distance Learning:

presentation technologies, distribution technologies, interaction technologies. Telecommunications tools for distance learning are of two kinds: synchronous (communications between users at the same time) and asynchronous tools (communications between users independent of time). Synchronous Internet delivery is similar to the traditional classroom (face-to-face learning). Synchronous tools enable individual and group work, learning from the instructor and other students, spontaneity and immediacy, immediate feedback. They are very good for brainstorming and starting of new activities. Asynchronous Internet delivery is similar to the traditional distance learning. Asynchronous tools enable learners to organize learning in their own rythme (self-paced learning), collaboration with learners from different time zones, reflected feedback, producing FAQ. They are very good for text-based communication and distributing file based information to learners. In the case of synchronous communication tutors more easily keep the thread of a discussion on track than in the case of asynchronous communication. In the case of asynchronous discussion tutors can answer only once to all (instead of giving answer to each learner) learners and can moderate discussion without the pressure of time (not immediately).

6. Conclusion

At present Life Long Learning can be realized in traditional form or by Distance Learning. Distance Learning should facilitate learning process (more contacts with tutors than in traditional classroom especially in asynchronous mode, possibility to self evaluation). Learning material should be prepared in interesting form using multimedia and telematics tools (graphics, animationns, simulations, audio, video) concerning economic and pedagogic aspects (Kolb's experiential learning theory). Distance Learning uses Internet (all tools that Internet provides). Distances courses should be developed ensuring high quality of learning. Global Information Infrastructure should be built ensuring realization of distance learning on global scale. Use of EDI technology may facilitate administration work and store information concerning learners, their education (helpful to find good needful job and possibility to update knowledge. EDI technology used in educational applications can ensure compatibility on world wild scale facilitating educational process. Electronic libraries can be very good supplemental learning material. They may contain current updated knowledge, they may be destined for common use. Asynchronous Learning Networks are very useful in Life Long Learning process especially for working adults enabling education on global scale independently on time and place. ALNs are based on the modern achievements of Information and Communication Technology.

Standardization plays a very big role for the development of distance education (concerning Information Infrastructure, administration functions (by the use of EDI), modern IT technology and telecommunications tools for preparing good courses (e.g. IMS Global Learning Consortium came to existence to elaborate world wide technical standards for distributed distance learning).

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STUDYING APPROACHES FOR INDIVIDUALISED DISTANCE LEARNING

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Introduction to adaptive technologies

The direction, distance learning is evolving in, is individualisation. Individualisation is considered as an advantage in most educational cases, but in distance learning it is the only possibility to compensate the lack of personal communication, emotional contact and feedback from instructor.

Individualisation can be realised through adaptation of educational materials, computer programs, and learning technology systems in general. The key tasks in providing individualisation of distance education are the ones of development of adaptive technologies and dynamic modular courseware building.

The term "adaptivity" of learning technology systems is being used in at least five meanings:

- adaptivity in time (to developments of new hard- and software)
- interface adaptivity
- adaptivity of structure and content of DL course
- learning style adaptivity
- adaptivity of educational process management

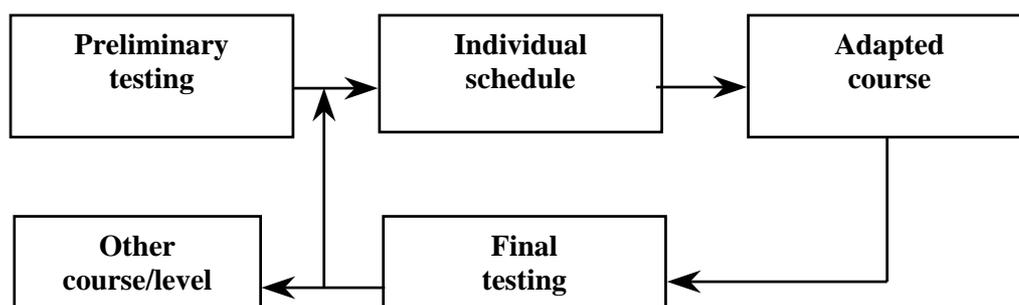
In distance learning environment various components could possess adaptive quality, e.g. learning schedule, course plan, learning modules (quantity of new information per module), tests (complexity level), examples. It is also necessary to take into account that all adaptive components are interconnected and influence each other. For example, adaptive tests can change learning schedule, thus spreading the adaptive quality on this learning environment component.

Adaptive assessment. Empirical approach.

The past experience of one of the authors, E.M.Osipova, who, together with her team, has developed and implemented adaptive tests in the courses on high-performance computing for supercomputer centre, proves the effectiveness of application of adaptive technologies in distance learning.

Adaptive tests were used for the following purposes: for distance learners to provide self-control, for educators to assess distantly the knowledge acquired by learners, and also to manage educational process. To manage means here 1) to determine the basic level of learner's knowledge and assist in composing of individual course schedule; 2) to determine the degree of knowledge perception and work out recommendations on repeating some materials if necessary.

The simple example of adaptation - adaptive assessment - is demonstrated below.



The mechanism of adaptive testing has advantages when teaching students with different basic knowledge level, busy with work or other studies, etc. In this case, the possibility to generate an individual plan of studies can save learner's time and efforts. As it is hardly possible for a learner to objectively self-evaluate his/her level of knowledge and competence on the subject, the technology of support of individual plan generation plays an important role in increasing effectiveness of education, both in terms of knowledge acquired and time saved.

What is really important now, is to pass from empirical approach to scientific-based and research-proven methods.

Adaptive systems. Basis for development.

Individualisation is based on adaptive technologies, the type of technologies that adapt a predefined set of educational materials to individual abilities and demands of learners. If to speak about Internet-based distance learning (or, generally, about computer-based distance learning), in order to provide individualisation, we should consider three main fields of studies:

- psychosocial characteristics of learners
- learner's attitude towards computers
- particular learning styles

We have studied the literature and Internet resources, available on the subject, and have defined three main types of questionnaires to use in the research according to the three fields described above. These are:

- psychological tests

For evaluation of cognitive functions:

- WAIS (Wechsler Adult Intelligence Scale);
- Correction test - for studies of attention concentration, stability and fluctuations of attention;
- Black-red tables (by F. Gorbov) - to study attention switching;

For studies of personality traits:

- 16 PF-questionnaire (Sixteen Personality Factor Questionnaire, Cattell R.B.);
- Test on coping mechanisms by E.Heim (1988);
- Alexitimia test (Toronto alexitimia scale (TAS)
- The test on meaning of life orientations, as adapted version of test Purpose-in Life Test (PIL) Crumbaugh, Maholick, 1981;

Interpersonal communication: method on empathy.

For studies of psychic state:

- Zung (self-appraisal depression scale) test;
- Integral test on anxiety developed in Bekhterev Psychoneurological Institute, SPb;
- Color Lucher test;
- Level of Neurotic Asthenia test

For studies in social-psychological sphere:

- Method on quality of life evaluation;
- Questionnaires for pedagogical staff;
- Questionnaires for students.

- computer-attitude questionnaires (for example, Computer Anxiety and Learning Measure Test (CALM) by McInerney and McInerney, 1994)
- learning styles questionnaires (for example, Visual-Verbal Learning Styles by J.Kirby)

What criteria (most evident) for building of adaptive systems are expected to be developed among others on the basis of the research conducted:

- verbal/visual/other learning style - to use for accenting DL course materials on a particular type of media
- group-based or individual learning - to be used for choosing the communication technology and type of remote studies
- recommended duration of learning module, quantity of new information, etc.

The research conducted will also help to determine the degree of influence of new information technologies on psychosocial characteristics of various types of learners and work out recommendations on the effective use of information technologies in educational process.

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IN-SERVICE PRESCHOOL TEACHERS: ARE THEY READY FOR ODL?

Rozita Tsoni and Jenny Pange

Abstract

The introduction of New Technologies in education, is an issue with many aspects and possibilities. Learning through New Technologies (NT) and specially using the web for in-service preschool teachers is very important. The implementation of NT in preschool education is at its infancy in Greece.

The hypothesis to be tested is 'Could we create an ODL environment for our in-service preschool teachers?'

According to our research concerning the level of knowledge in NT of in-service preschool teachers in Greece, we found that 72,6% of them did not use any of NT materials at their schools eg TV, video, projector, computers. Only 6,1% had used once or for a small period of time - computers in their classroom. Moreover, 79,8% of the in-service preschool teachers in our sample, didn't have any experience at all, in using the Internet.

When we asked for their suggestions for an ODL system only 4% of them were well informed about ODL and suggested that an ODL system could be used for their further education and for retrieving some interesting information. They all also agreed that a continuing education learning system using the web might be necessary for them. But, 32,5% of teachers believed that it has to be given greater interest in the introduction of new technologies in education by organizing more theoretical lectures followed by some practice where a collaboration in between students could also be applied. The majority of the preschool in-service teachers said that they were able to spend enough time of their weekends and vacations in order to participate in seminars concerning new educational technologies.

So, a theoretical course with some practice on NT and the web would be a good start. This course has to be offered during weekends and vacations and not during the week. In conclusion, we can say that the transition from the traditional teaching to an ODL system using the web is quite difficult to cope with for in-service preschool teachers in Greece, at least for the beginning.

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DISTANCE LEARNING IN EASTERN FINLAND

Eastern Finland Distance Learning Network

Eastern Finland Distance Learning Network - Part of the national Distance Learning Project

In 1997 the National Board of Education in Finland and the Finnish Broadcasting Company, together with 12 educational institutes, started a development project funded by the EU for Upper Secondary Distance Education. At the moment, there are nearly 80 distance learning institutes with approximately 2500 students in Finland. The development work is based on local aspects. The institutes form local and national networks. The Eastern Finland Distance Learning Network is one of these networks where eight schools (Iisalmi, Joensuu, Kajaani, Kuopio, Mikkeli, Paltamo, Savonlinna and Varkaus) co-operate by developing e.g. common course offerings, materials and methods. The project is mainly funded by ESF. County governments, local communities and various interest groups from the economic life are also committed to partial financing of the project.

Distance Learning – Co-operation without limits

The Upper Secondary Distance Learning Project aims for promoting general education, international contacts and entrepreneurship among learners. It provides the employed and the unemployed a means of completing the entire upper secondary school syllabus or just individual courses. Additionally, it is possible for them to achieve the matriculation exam. Distance learning offers a chance to study at one's own pace, irrespective of one's home region or the time of day or year. The Distance Learning project in Eastern Finland specializes in developing distance learning methods and models for co-operation and networking. Co-operation within the educational network provides a diverse course offering where each individual student can choose courses according to his personal learning style irrespective of one's home institution. One of the main objectives is to increase co-operation between students, tutors, schools and working life.

Computer assisted learning is a vital part of the Distance Learning project. This enables the creation of individual study schemes and counselling irrespective of one's home region. Study counselling in each subject is provided within an open and telematic learning environment (radio, TV, Internet, audio tapes, Email, network programmes, phone, fax and traditional textbooks). The co-operative and telematic learning environment has changed the role of the traditional teacher. Working within this new culture focuses on networking, interaction, instruction and co-operation skills. Encouragement, motivating and supporting skills are a vital part of the tutor's daily work. The implementation and pedagogical utilization of distance learning require further training for teachers.

Flexible and individual distance learning increases equality in education and enables lifelong learning. The need for distance learning possibilities in a sparsely populated country such as Finland is great. The use of information and communication technologies for studying also increases the potential for creating distance employment opportunities outside the growth areas.

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VIRTUAL UNIVERSITY STRATEGY IN THE EASTERN FINLAND REGIONAL UNIVERSITY NETWORK

Matti Heilio, Lappeenranta University of Technology

Introduction

Finland is a country with special geographic and demographic features. Large sparsely populated regions with scattered small towns and localities. This structure has led to active regional policy and in particular in the university policy this has resulted in a distributed system of numerous relatively small university units. The concern about academic competitiveness, critical mass for success etc have been a crucial topic in the national discussion agenda for 30 years. The opportunities opened by the distant education technologies, network based learning environments etc. are seen as a potential resource to alleviate some real existing problems in the Finnish university system.

Eastern Finland Virtual University

The three Eastern Finland Universities have each their own area of specialization Lappeenranta University of Technology (Engineering, Economics), The University of Joensuu (Humanities, Natural Sciences) and The University of Kuopio (Medicine and Social Sciences). They share several common interests especially in the basic generic disciplines (mathematics, computer science, educational development) and also common challenges in the regional development questions and initiatives towards innovative interdisciplinary programmes (environmental studies, computational technologies, business economics and law). To support and accelerate these goals the three universities have started a joint programme "Eastern Finland Virtual University". In this talk I will report about this initiative and describe the ongoing projects. I try to point out some of the special challenges and objectives that are associated with this endeavour. What are the criteria for success and real added value in setting up distant education network in the academic setting. Where are the ultimate benefits that could be expected from the distributed learning environments. As a case example I describe an ongoing collaboration between several Institutes of Applied Mathematics aiming toward a web-based pooled curriculum and a network supported learning environment.

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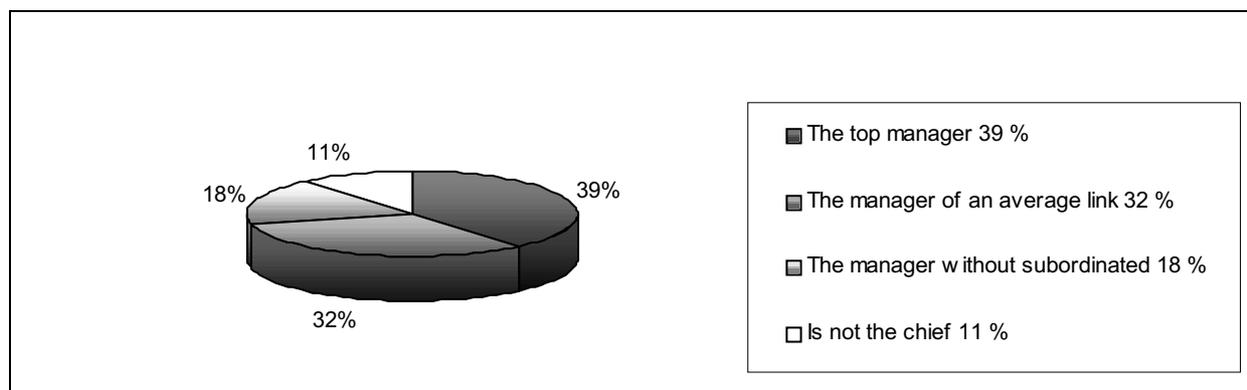
MENTAL AND CULTURAL SPECIFIC DETAILS OF DISTANCE LEARNING IN PROVINCE OF RUSSIA

Margorskaya Olga, Vladimirov Vitaly, International Center of Distance Learning "Baikal-Link", Russia

The region of the lake Baikal is one of the richest nature resources area in Russia: the hydroelectric power, gas, coal, wood, treasures of the soil. Increasing of a competition among the enterprises and the tendencies to development of international business are the basic motivation of the adults to training in management and business.

The international centre of distance learning "Baikal-Link" is non-state educational enterprise providing business training for adults since 1992. There were trained about 1500 students during this period.

The qualitative structure of the students is submitted on the diagram:



Our mission of training is a help to managers of enterprises to estimate environment and to influence efficiently to internal surroundings.

The objective of the present researches is the segmentation of the students of ICDL "Baikal - Link" preferred to him on styles in management and training: "Activeman", "Reflector", "Theorists", "Pragmatists".

This choice of segmentation is connected with specificity of management of changes in province: cultural approach is more productive, than rational methods and technologies.

The important stages of cultural approach is "disclosing" existing mental models (*what is the preferred style at our students?*), realisation of changes during training process and fastening new mental models (*harmonious combination of styles*).

Task of business schools is the training in the field of management, marketing, financial management. Specificity of training of the adults has additional task: to help the practising managers to be in the greater degree "Activeman", "Reflector", "Theorists" and "Pragmatists".

The researches of preferred styles in management are necessary for making decision of following tasks:

1. Realisation of individual consulting with students during training;
2. Development of the manuals and learning materials combining all styles of training.
3. Efficiency of advertising of training programmes.

Since 1995 were carried out the researches of the students of business school. There were a lot of methods.

It was selectively carried out the qualitative analysis of some Russian methodical manuals in management.

The researches in the region of lake Baikal have shown preferable style of consumers of our courses is - "Activeman", 34 %.

The orientation to "Theorists" is more characteristic for the Russian manuals. The considered manuals ignore interests such important, as have shown researches, component of style of training of our students, as "Activeman".

Requirement in harmonious development of styles of training and management demands attract attention to style "Activeman" on training by means of:

- Business and role games;
- Work in a team;
- Collective discussion of educational situations, discussion;
- Public performances;
- Creation on tutorials extreme situations (difficult task, shortage of time, competition etc.).

Role of tutor is facilitator in such cases.

It is opened unique opportunities of style "Activeman" in using interactive manuals of distance learning - Internet in combination to other manuals (book, videomaterials).

Strengthening of style of managers "Pragmatist" changes there mental relation to training: from the information distributed (for example, lecture), to the information of required (consulting). Students of distance learning should have opportunity of making decision of works problems during training, achieve outputs. Role of tutor in such situation is consultant.

The important specificity of distance learning in province is lack of people capable to execute a role of business consultants. If in Moscow the amount of consulting companies riches already to three-value figures and there is a possibility of choosing of experts in a market, in such regions as Siberia are not there enough consulting companies at present.

The most of institutes in Russia look at distance learning, as a process constructed on using of computer technologies, and development of distance learning education connect with the problems of access the resources to Internet. Another opinion is the problem of development of distance learning in province consists in long-term and expensive training of tutors, knowing local specificity of business efficiency. The regional learning centres of distance learning support this point of view.

Thus, development of distance learning education in province has following characteristics:

- preferability of style in training - "Activeman" (34 %) it should be strengthened a role tutor as a facilitator;
- importance of long-term and expensive process of training of local tutors, capable to execute a role business experts.

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**TOWARDS INTERACTIVE LEARNING.
WEB-BASED COURSE “MODERN ENVIRONMENT 2001”
AT TALLINN TECHNICAL UNIVERSITY, ESTONIA**

*Marika Olander, Open University; Marit Seepõld, Research and Development Department,
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Lifelong learning is a recognised concept in modern society. It means that interested people must have the access to the learning resources not depending their living or working place, not depending on time. Those needs are stimulating the trend of wider use of information and communication technology in education and professional training of different target groups. At the same time use of ICT is a motor of globalising of education and training, motor of international co-operation and also international competition on educational market.

The development of modern distance learning in Tallinn Technical University started about ten years ago when the new concept of distance education was introduced. During the first period of the development the international support from Nordic countries and other European countries, was remarkable. At the moment we have two Distance Education Study Centres in Estonia. They are quite similar to EuroStudy Centers in other parts of Europe. In fact those DE study centers acting in close co-operation with universities are the promoters of the development of DE, open learning, use of ICT and developing of new learning technologies in Estonia.

Web-based course “Modern Environment 2001” - promoting interactive learning and implementing ICT in university level professional training at Tallinn Technical University.

During the preparation phase a study material package for the course was produced by Tallinn Technical University with the help of Turku University, Finland.

The package consists of

- five textbooks
- especially designed study guides - electronic manuals with on-line links to the different Internet resources

The web-based learning environment for the course was designed to support the web-based co-operative learning using WebCT software.

WebCT is installed in Linux server at the open University, Tallinn Technical University.

URL address: <http://www.cce.ttu.ee:8911>

The course “Kaasaegne Keskkond” (“Modern Environment”) is accessible by the registered users only.

The web-based learning environment with electronic study guides, glossary, on-line assignments and constantly updated links, different communication tools were created, continuously developed and tested during the pilot course in spring 2000. Interaction among students and between students and the instructor was promoted taking advantage of a wide range of WebCT communication tools incl. bulletin board discussion forums, e-mail, calendar tool and personal homepage tool.

“Modern Environment 2001” (“Kaasaegne Keskkond”)

Duration: November, 2000 – April, 2001

Length of the course: 180 hours or 4,5 CP

Target group: students, postgraduate students, people interested in environmental problems and dealing with environmental matters in their work.

Course consists of five modules:

- environmental ecology
- global environmental problems
- changing environment and health
- environment and technology
- increasing awareness of environmental issues.

Each participant got his/her personal user name and password for accessing the web-based learning environment. Total number of registered participants were 36.

Five local study groups were formed in different regions of Estonia: Sagadi, Helme, Võru, Tallinn and Kuressaare. Each study group had a local tutor and a private communication forum.

For promoting awareness of environmental issues as well as interactive learning opportunities different distance learning methods were used:

Supervised self-study with study material, textbooks and web-based study guides

Two tutorial face to face workshops, one at Tallinn Technical University, the other at Sagadi Training Centre

Two audio-seminars carried out at Tallinn Technical University

Study group meetings at local study centres supervised by a local tutor

- Written essays and assignments with personal feedback given by experts.
- Continuous networking and communication via audio-seminars and WebCT discussion forums
 - between students and instructors, lecturers and tutors
 - among students

In order to increase interactivity different discussion forums were created

- public topics for discussions during each learning module
- private forums for each study group

Active participation in various discussion forums was required. The requirements were clearly specified.

Summary and outcomes:

- Online learning enables to increase interactivity in the learning process. The role of instructors and the local tutors in activating the learners and the whole co-operative learning process is very important and essential. Student engagement with material, and especially with co-learners and the instructor, is an essential design feature of the course and is specifically intended to both encourage and promote thinking skills and reflection.
- The modern web-based interactive learning and communication tools are able to meet the needs of different groups of learners. Opportunities for regional and local citizens for active participation in electronic discussion forums using ODL methods has to be developed further.

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USING WEB-BASED SYNCHRONOUS ACTIVITIES - A WAY FOR INCREASING THE DISTANCE LEARNING EFFICIENCY

Gabriel Dima, Marcel Profirescu, EDIL R&D Centre, University "Politehnica" of Bucharest, Romania

Introduction

The paper presents the design, development and implementation of web-based synchronous activities within an online course in microelectronics using the whiteboard, chat and videoconferencing facilities of the Collaboration Module of LOTUS Learning Space 4.01 environment. The course was initially implemented in an asynchronous way and was run for two academic years in the Department of Electronics, University "Politehnica" of Bucharest. The main goal of this implementation is to increase the learning process efficiency by increasing the student's level of knowledge and decreasing the completion time.

Asynchronous implementation

The pilot course was derived from a "classic" postgraduate course given at University Politehnica of Bucharest and primarily implemented using the Core Module of LOTUS Learning Space (LLS) environment.. The text-based course material was reorganized in a larger number of chapters in order to better keep trace of the students' assessment. The students must pass a preliminary test from the course prerequisite topics (semiconductor physics, electron devices and numerical methods) in order to be admitted. Furthermore, the access to a given chapter is granted only if the student passed the tests from the previous chapters. A maximum number of attempts to pass a test may be imposed by the tutor. This way the learning environment offers the students an adaptive instructional guidance through the course material making the learning process more efficient.

Some chapters have laboratory work that in the first implementation stage was "classically" perform in our centre in a face-to-face approach and that in an online manner by means of web-based interfaces that were designed for all the simulation tools used within the lab. These interfaces allow a student to launch remotely a job using a low cost Pentium based computer. As the jobs might run for periods of time between half hour to several hours depending the simulation tool and the computer load, we choose an asynchronous way of working, the results arriving as attachments to e-mail messages in the student mail box. It is important to point out that these interfaces offer limited access to the simulation tools features as they are topic-oriented designed. This way the student can easy cope with the complexity of the simulators (keywords, physical models, numerical methods, etc.) and spend most of the time for the real work.

Synchronous activities implementation

In order to increase the efficiency of the learning process we implemented live sessions as well as online discussions within the course. On line discussions supplement live sessions and other course activities. Discussions provide an interactive forum for course participants to discuss course-related content.

A live session is facilitated by an instructor, and requires all students to be logged on during a time period determined by the instructor. In a live session, instructors presents to students text and graphics on a Whiteboard, real-time applications that appears in a window on each student's screen and/or ad hoc classroom questions that each student can see on the screen.

In Figure 1 is presented a real-time application that show the carrier behaviour in a heterostructure. The student is able to understand much faster what happen inside the device and how the transport parameters are affected by boundary conditions, material type and biases.

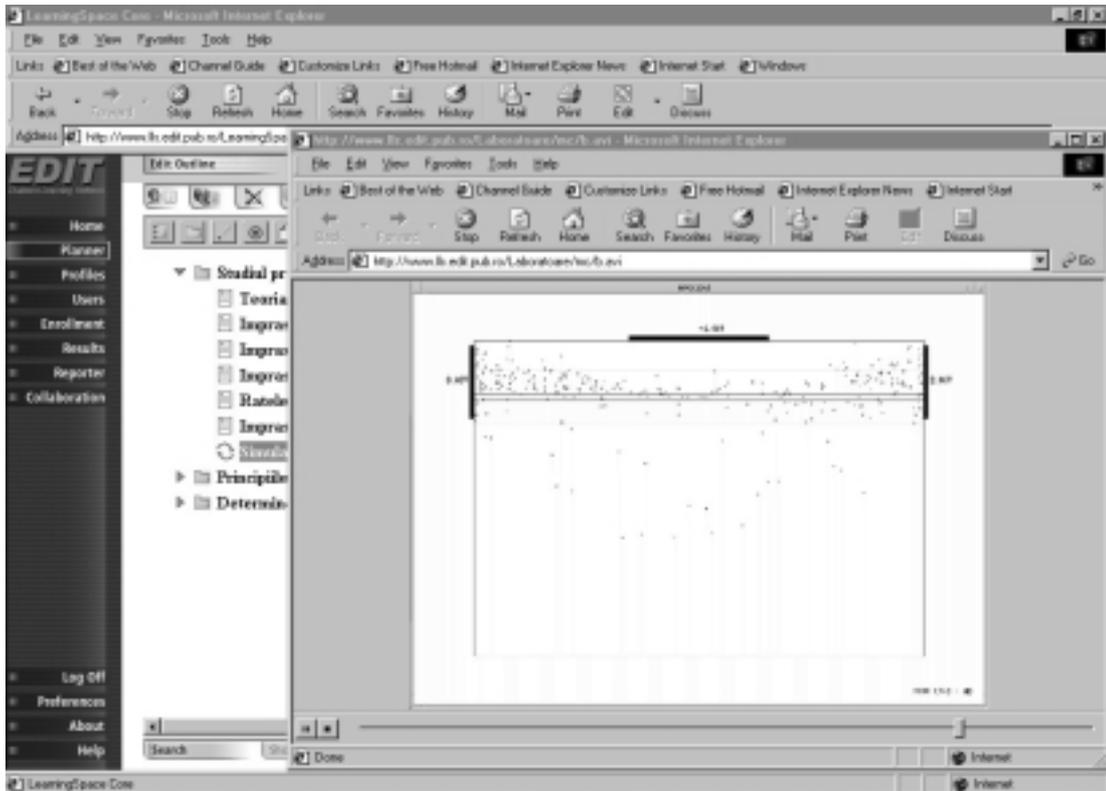


Figure 1: Screen snapshot of a live session about particle transport in semiconductor devices

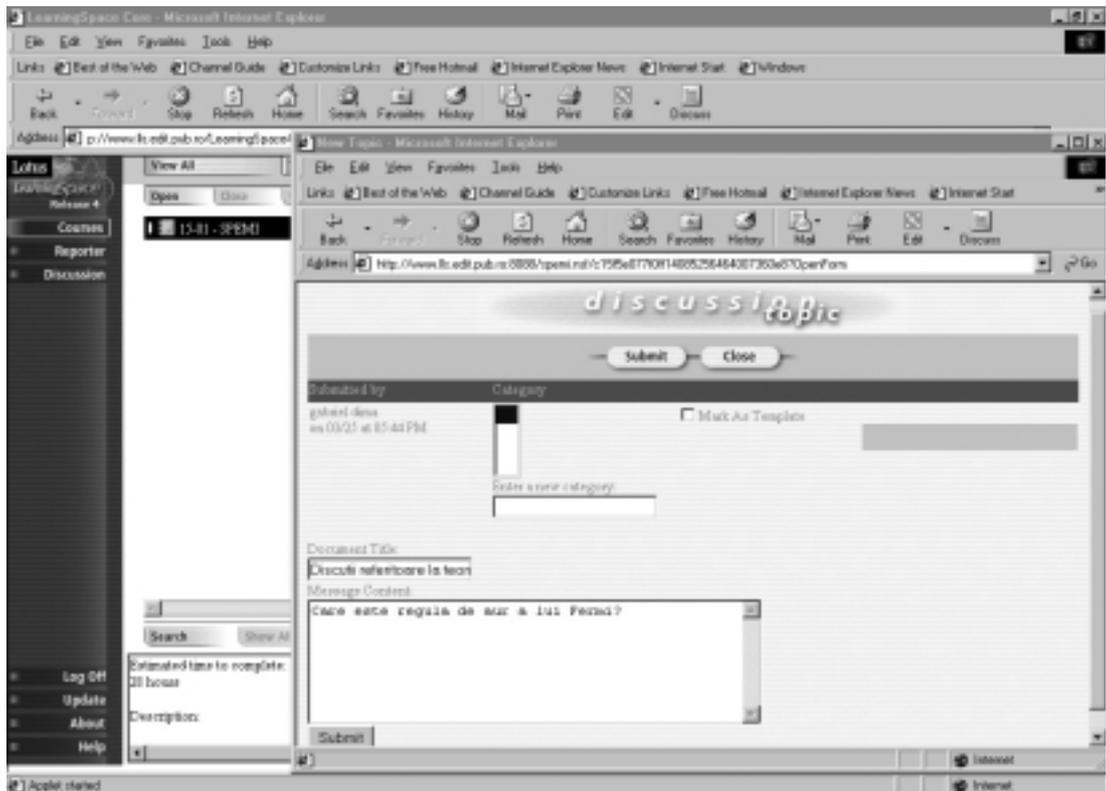


Figure 2: Screen snapshot of a discussion session

Online discussions allow real-time interaction between course participants. This way design projects and theoretical problems can be discussed without any delays. At the beginning of the course these facility is frequently used by students for getting known each other. Online discussions do not require all course participants to be logged on the same time.

Pilot run

The new implemented synchronous activities were evaluated by a group of M.Sc. students in Microelectronics from our department in the first semester of the 2000-2001 academic year. All synchronous activities were recorded in the LLS Collaboration Module log files and evaluated after each session. Furthermore the students were asked to fill in a questionnaire regarding their experience using the new activities. An overview of the results shows that the students accept quite easy the live sessions as well as the online discussions and successfully use them in the learning process. A comparison of the students' knowledge level with the one of the last academic year shows an increase of the average final mark with 9.7% while the average completion time decrease with 18.3%.

Conclusions

The development of an online course in Microelectronics by implementing web-based synchronous activities is presented. They consist in live sessions and online discussions and were implemented using the collaborative features of LOTUS Learning Space 4.01 environment. This allows a better interaction between the students and between the students and the instructor resulting in better grades and shorter completion time.

Acknowledgements

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DEVELOPMENT OF AN INTERNET DELIVERED INTERINSTITUTIONAL M.Sc. IN EUROPEAN FOOD REGULATORY AFFAIRS

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In 1994 The Irish Universities Nutrition Alliance IUNA was formally established to promote research and teaching between the nutrition units of Trinity College Dublin, (TCD), The University of Ulster (UU) and University College Cork (UCC). Following several years of successful research collaboration, IUNA decided to extend the collaboration into developing an interinstitutional M.Sc. in European Food Regulatory Affairs.

The impetus for development of the M.Sc. programme arose following consultation between IUNA and various stakeholders in the food sector. They identified a need to provide an innovative and up-to-date approach to training in this rapidly evolving field. There is no formal course of training in European Food Regulatory Affairs offered by any institution in the EU. New entrants into this field in the food industry receive training by apprenticeship within a company's regulatory affairs department or that of a national regulatory agency. Subsequently, IUNA submitted a pilot project to the European Commission under the *Leonardo da Vinci programme*. The project was funded for a period of 2 years, which commenced in October 1999. (IRL/98/2.05644/PI/II.1.1.c/FPC).

The primary objective of the project was to develop a curriculum for an M.Sc. in European Food Regulatory Affairs which would be pan-European, distance taught and which would encompass the dynamic, evolutionary, and complex nature of European food regulatory affairs

In order to implement the programme, a project management group was set up consisting of an academic consultative group from the three Universities and an industrial consultative group. Because it was envisaged that potential applicants would already be employed in the food sector, and would be located throughout Europe and beyond, it was decided from the outset that the entire course would be delivered via the Internet.

Utilising the combined expertise of the project management group, the course content was designed to consist of five taught modules and a research project. Module specific assignments were designed, lecturers identified and assessment methods for each module developed.

In terms of issues related to the awarding of degrees, whereas models for awarding interinstitutional degrees exist elsewhere in Europe, no such model has previously been developed between the above three Universities. A number of potential models involving the three Universities were originally proposed. However, because the University of Ulster presently offers a successful M.Sc. in Biomedical Science that is distance taught via the Internet, it was decided to adapt their model for the present course. Thus the M.Sc. degree programme will be offered by IUNA and awarded by The University of Ulster. The degree programme will be validated by UU.

Based on the present model, it is proposed that the structures of IUNA become more formalised in order that further programmes can be developed by the IUNA partners and offered through the new Institute.

FLEXIBLE (INCLUDING DISTANCE) EDUCATION AT THE UNIVERSITY OF LEEDS, UK

Christine Talbot, Flexible Learning Development Officer, University of Leeds

Introduction

The poster presentation will provide a picture of developments taking place in flexible (including distance) education at the University of Leeds, UK.

Abstract

Over the past four or five years the University of Leeds - a traditional, research-led, UK Russell Group university - has been exploring the potential for introducing more flexible and innovative approaches to its learning and teaching practices and much has been achieved. A lot of work has been done in a devolved, departmental, ad hoc sort of way, typical of many similar universities in the UK. But with the new millennium has come a new approach to developments at Leeds. At the instigation of the Pro Vice Chancellor for Learning and Teaching, a University strategy for flexible learning (including distance learning) has been formulated. It incorporates a vision for Leeds as an institution '*committed to designing, developing and delivering Programmes of Study that use modes of learning appropriate to a major university in the 21st century, within a culture of widening participation and lifelong learning in a Communications and Information Technology oriented society*'.

An electronic learner support platform (Bodington Common) has been developed in-house and is available for all academic departments to use in providing high quality learning and teaching opportunities for all university students, whether on or off campus, full or part time, undergraduate or postgraduate. This development has taken place within the Flexible Learning Development Unit (FLDU) – established by the University to provide academic and other staff with support in designing, developing and delivering flexible learning and teaching. The Flexible Learning Development Officer, based in FLDU, is often the first point of contact for staff considering introducing some elements of student-centred, flexible learning into their modules, or developing a full Programme of Study to be delivered by distance learning. She offers advice and consultancy to individuals or teams of people within academic departments, delivers workshops for staff on various aspects of flexible learning (sometimes in conjunction with the Staff and Departmental Development Unit), facilitates the Flexible Learning Network across the University, and provides design and editorial assistance at the materials development stage.

Other units and academic services across the University also now have on their agendas issues and developments related to flexible, including distance, learning. In particular the Library is addressing the need for more flexible library services by both its on and off campus users. Appointments of Distance Learning Services Coordinator, Intellectual Property Rights Officer and Electronic Resources Officer have been made in recent years. Media Services and Information Systems Services are also actively engaged in putting in place services and systems to support staff and students teaching and studying flexibly at Leeds.

INTERNET-BASED COURSES ON MANAGEMENT FOR RUSSIAN BUSINESSMEN

A. Lifshits, T. Gavrilova, Vocational Renewal Centre "Management and Computer Technologies"

Abstract

Distance learning courses in the field of modern management issues is developed and discussed. VRC provides methodological, software and telecommunication implementation of learning material with the use of new technologies (WWW- server with lectures and tests or on-line work, CD-ROM for off-line study, teleconferences via INTERNET). The paper describes mainly the software technology issues of the several courses targeted at managers.

Introduction

Due to enormous space of Russian territory, transport difficulties, non-uniform distribution of high qualifies teaching staff and due to non-uniform speed of market-oriented transformation of economy, Distance Learning is very important under contemporary Russian conditions. Development in information technology impacts all fields of educational research, from basic to applied. The described projects are based at interdisciplinary research on new Internet technologies which results may be implemented in a wide variety of practical distance learning courses. Distance learning (DL) courses "Up-to-date construction management" and "Business planning and Investment analysis" were developed and successfully carried out by Vocational Renewal Centre "Management and Computer Technologies" in 1999-2001 within the projects partially supported by grants of Eurasia foundation (www.eurasia.msk.ru). The major part of students (150 in total) presents small and middle enterprises and companies from St.-Petersburg, Vyborg, Petrozavodsk, Cheljabinsk, Archangelsk, Pskov, Vologda, Obninsk, Murmansk, Jujzno-Sakhalinsk and other places mainly of North-West region of Russia. The interest to distance learning courses may be explained by the fact that many managers in CIS companies do not have enough knowledge in new forms of management, finances and law.

DL trends

The simple overview show that there are two opposite approaches to the organisation of distance learning in WWW. The first of them uses on-line mode, the second one – off-line. In the first case only a standard WWW-browser is required, while in the second case auxiliary software is necessary on the client host. Both of the systems, however, function in the framework of the client-server technology and use CGI interface, which is common for most of such systems. It is worth mention that difference in these approaches is well correlated with the complexity of the corresponding learning material. For now, it is very difficult and at least inefficient to simulate complex processes via standard HTML (even with Java applets), therefore the use of special client software is justified. Currently, the following methods of distance learning in Internet are well studied and widely used in practice:

- WWW as a data source without any efforts to maintain a DL system.;
- Server-hosted software development;
- Auxiliary client-hosted software development.

The most important directions of further development of Internet-based technologies which would help in maintaining DL systems, are (except Java or other script language applets):

- HTML extensions for CCI (Client Communication Interface);
- Synchronous conversation applications for WWW (analogs of Unix 'talk' or Windows 'chat').
- Multimedia newsgroups.
- Virtual reality.

Methodology

This paper deals with our experience based on the results of the both projects devoted to management in construction and other business companies. The main project objectives were:

- to design the course's structure and materials;
- to provide methodological, software and telecommunication implementation of learning material with the use of new technologies (WWW- server with lectures and tests for on-line work, CD-ROM for off-line study, teleconferences via INTERNET, feedback with tutors via e-mail, etc.);
- to develop special software tools for rapid prototyping of different DL courses and for maintenance of administration procedures.

The content of the courses were equivalent to the 60-80 hours university courses each (in the first project authored by Prof. Kaplan and Dr. Maslova, and in the second project by Prof. Gorbashko and Ph.D Rogova, Ph.D Karlik). Each student studied 70-80 paragraphs, passed through 6-8 tests, participated in 3 teleconferences and took part in final test.

On-line learning procedure was the following (Fig.1):

1. the student gets information about the courses on the Internet site or from the other place, he/she chooses the appropriate course from the Course-list, fills registration form and receives password and instructional material (CD-ROM);
2. then the student studies material and tests in individual pace, takes part in teleconferences under the tutor's guidance;
3. when the student finishes the study he/she passes through the final quiz and gets the certificate.

Architecture

The described projects are based mainly on WWW-platform. WWW unifies several existing Internet protocols (such as ftp, http, wais, etc.) and one new (html) around the concept of hypertext which becomes standard *de facto* in DL.

The developed system gives the student the following modes of study:

- A. Plain distribution of volumes of learning material. These include both online tutorials in standard formats (html, rtf, etc.) and some special interactive courses, intended to be run as local applications;
- B. Collaborative Learning in the network (via Internet-based teleconferences on special topics. Distant tutors work as moderators.);
- C. Interactive online courses with immediate access via HTML browsers.

Implementation of B and C methods of DL requires special Internet programming tools which were developed. Having analyzed some existing DL systems, which function in WWW, one may draw its typical structure. Usually the following active components which may be represented either by "real" human persons or special programs (here we enter the multi-agency) are found in such systems:

1. Tutor, which forms and presents learning material. It may be either a human being or a computer program (intelligent agent).

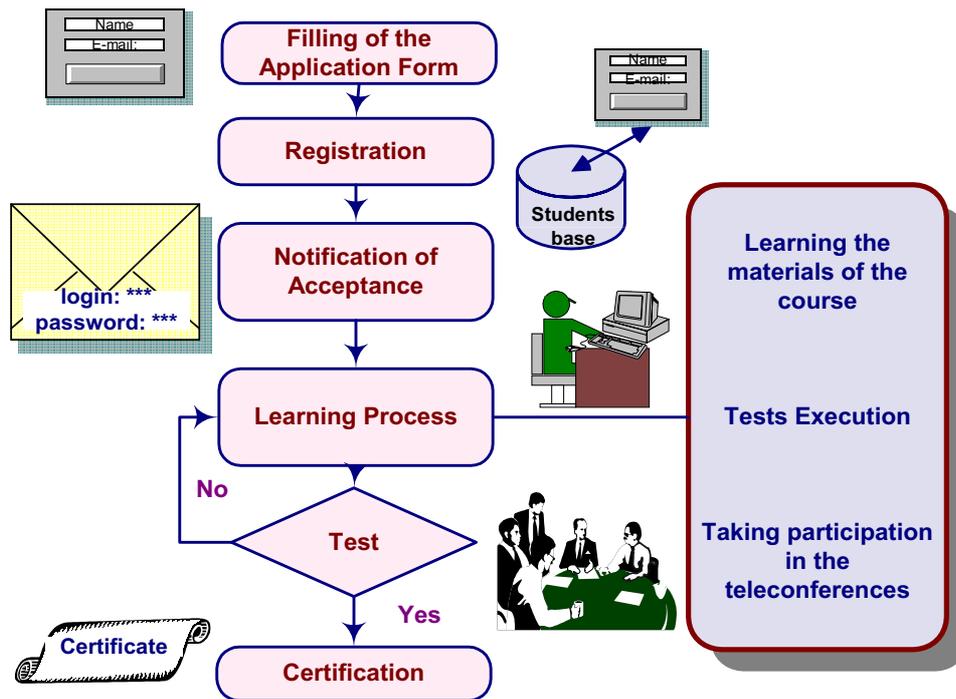


Fig.1. Learning process algorithm

2. Supervisor, which watches and controls the learning process. Again, it may be either human person, or an special (agent) program.
3. Assistant, which tries to help student in various aspects of learning process. The fields of assistance may include domain knowledge, adaptation of interface, Internet usage, etc.

The other usual components of DL systems include :

- Learning Material. It may be both hypertext and special training programs.
- External Data Sources. Everything not supported explicitly by the system, but required or recommended during education (hardcopy tutorials, video cassettes, etc.).
- Auxiliary Tools. This includes various computer techniques, which out of the scope of the system, but are required for it to function properly (such as communication programs).
- Administration subsystem.

Such typical structure may be implemented in different ways that is illustrated by many existing DL systems. The special software tool “DOSTUP” that implemented main program functions was developed in new programming language PYTHON (with Tim Geleverya as main programmer) for rapid course development and project maintenance and support. Fig.2 shows the functional structure and architecture of the developed system.

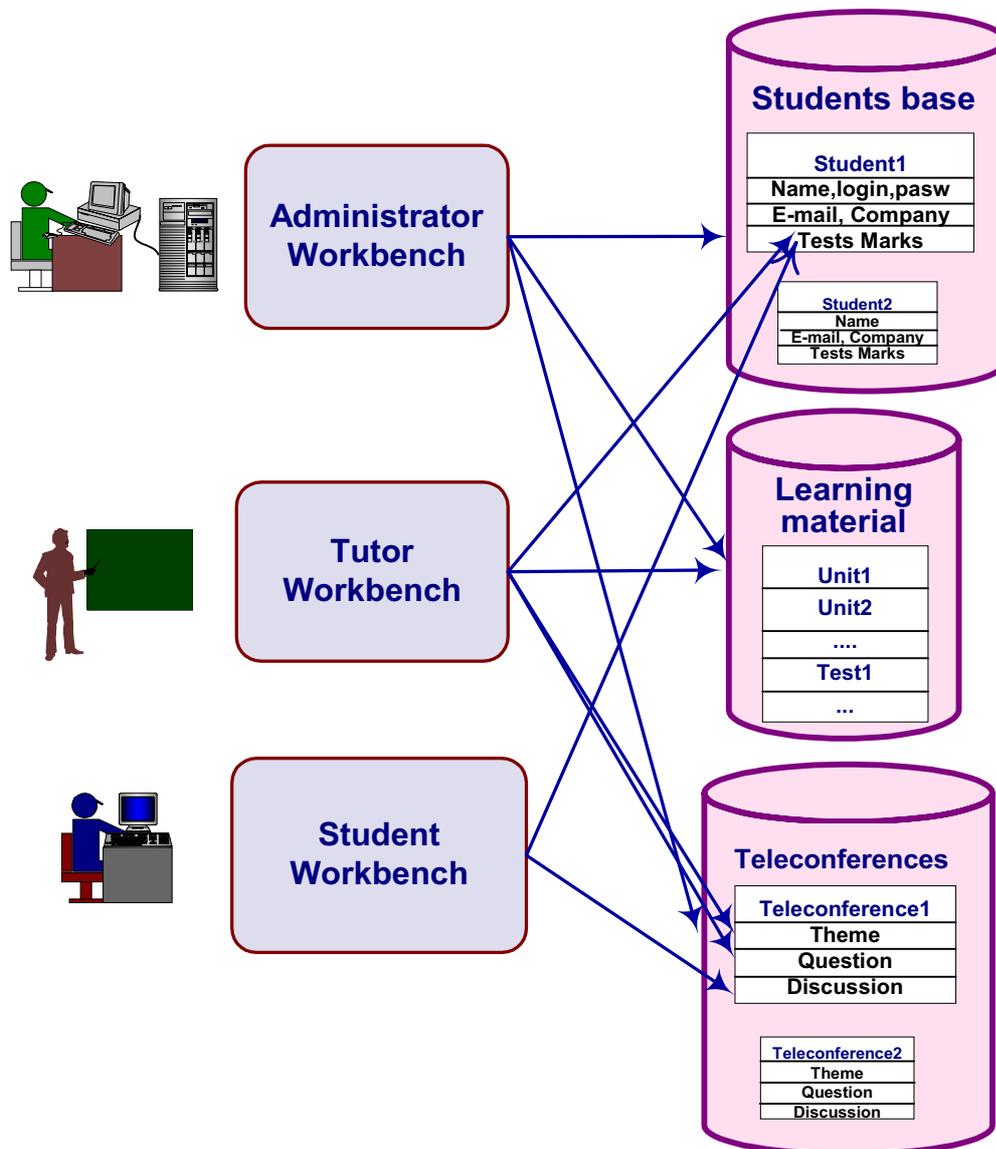


Fig. 2. System architecture

Discussion

The topics of distance education now are widely discussed among researchers, teachers, educationalists and authorities. In some countries DE becomes the item of the national strategy. But DL-courses development is still more art than science. That is why practical results of any DL-course implementation should be thoroughly examined. The described courses on construction management and business planning and investment analysis and corresponding software system are now on the Web (www.csa.ru/DL) and are under updating and preparing for commercial distribution. Now we have system from two WEB DL courses jointed with common faculty ,teaching methods and unified control system. It seems that this system is invariant to wide enough range of application course content and languages. It is proposed to develop this WEB DL system in the direction of creation of new business courses and to put it on a profit able basis.

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A STEP TOWARDS INTRODUCING E-LEARNING IN TERTIARY EDUCATION IN HUNGARY AN INITIATIVE IN LEGAL TRAINING THROUGH E-LEARNING

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Europe has moved into the Knowledge Age. Whether we take it or leave it or simply let ourselves be carried along with the stream, this implies changes for future ways of learning and teaching. Patterns of learning and teaching are changing fast. Individuals must adapt to changes in the scope and structure of knowledge, length of studies, delivery of instruction, study skills, ways of learning. We have hardly had time to fully explore the inherent potentialities of open and distance learning when e-learning is already pounding at the door.

This paper provides a brief description of a Hungarian e-learning initiative – an undergraduate legal course - and discusses the pedagogical issues of e-learning by analysing the shortcomings of this course. The paper also has an implicit but practical purpose, namely to share experience with those practitioners who are already ahead and invite suggestions in connection with the issues to be discussed later.

The Faculty of Law and Political Science of the Péter Pázmány Catholic University with nine institutes (twenty departments) and three independent departments was established in 1995. Training takes five academic years, that is ten semesters. The University provides full-time, part-time (correspondent), and distance learning courses as well. The number of obligatory subjects is 74.

Teaching at a distance through e-learning was first introduced in 1997 at Péter Pázmány Catholic University. At present the number of first-year students taking part in distance learning is 220. Their annual fee is HuF 180.000 per academic year.

The main characteristics of the course are as follows:

- The course material consists of traditional printed course books and printed auxiliary materials available in bookshops, and lecture notes of full-time face-to-face lectures available through the Internet.
- Learning performance measurement and assessment is based on traditional end-of-term examinations, ‘unsophisticated’ tutor marked assignments and self-assessed questions.
- Learning support is also rather limited: the students have access to their tutor through e-mail, or telephone. One-to-one meetings are not typical of the system.

Learning support is not systematic, rather ineffective and of non-interventionist character. Though the exploitation of information technology in higher education is extremely attractive, especially to young students, they do not have a clear idea of the nature of the learning experience this form of learning requires and offers. The dropout rate of the first year students is alarmingly high - about 40 percent. In spite of the fact that according to pre-study surveys neither access to technology, nor the necessary informatics competence is lacking, a relatively high percent of the students are reluctant to learn from on-line resources. Taking into consideration this fact and the prestige of the legal profession in Hungary the dropout rate can probably be due to the rather unusual way of learning and the inappropriate learning support. Unfortunately, this reluctance questions the effectiveness of any support system.

Over the past years the number of those seeking admittance to faculties of law has exceeded the number of those who can enter state universities consequently the number of those who wish to continue their studies at a private university has also increased. The great pressure to increase the

uptake of students without changing the number of lecturers has led to the abrupt introduction of distance learning through e-learning at the Faculty of Law and Political Science.

Unfortunately, the introduction of information and communication technology was not motivated by the supposition that their use would lead to high-quality learning since they do not provide ready-made knowledge but make students seek and process the necessary information.

The shortcomings of the system, which are primarily due to the insufficient time for the design and introduction of the course, are the lack of

- appropriate learning support with academic guidance, personalised teaching, study skills seminars, access to study groups, support for technology-related needs
- materials suitable for independent learning
- study guides
- effective interactive activities to enforce learning
- appropriate self-assessed questions and tutor marked assignments
- group tutorials providing different forms of informal assessment and more human contact.

Faced with these problems the Faculty is developing the system. The project is supported by a one-year governmental support programme (HuF 45 million).

The infrastructure (servers, networks) has already been formed to make materials and tutor support available. The training of materials designers and tutors also started in January 2001.

The aims of the project are:

- revealing and analysing the distance learning course of the University
- getting to know the international results, trends, creating the theoretical background of the development
- forming the institutional system of distance learning through e-learning
- providing the means (hardware, software) of e-learning
- designing e-learning materials
- developing a support system.

To be able to design effective e-learning courses the profound analysis of numerous factors - pedagogical, technological, individual, institutional, cultural, social, and sociological, economic etc- that make e-learning good seems to be inevitable.

For us it seems to be evident that the key factor is the pedagogical one, that is effective learning presupposes a learning and teaching strategy. But does any kind of e-learning have an established learning and teaching strategy? To answer this question we suggest the following classification of e-learning.

	Form and characteristics of learning	Age of learners	Length of “e-studies”	Materials (off-line/on-line)	Learning environment	Learning support	Pedagogical value
1.	Non-course-based informal learning (accidental, professional, learning, browsing for interest or information etc)	Varies unpredictably	Varies unpredictably	On-line materials	“Learn-station”	None	No learning and teaching strategy: The learning process is imperfect and unproductive
2.	Supplement to traditional teaching (school-based formal teaching/learning with sporadic (mainly experimental) on-line teaching/learning)	Under 18	Short as related to the lengthy course of formal studies	Traditional, printed materials with minimum on-line materials	Dominantly traditional classroom supplemented with minimum “learn-station” environment	Explicit teacher control	Traditional teaching has a learning and teaching strategy Face-to-face teaching covers the three stages of the learning process Pedagogical value of e-learning varies because it is forced into an inflexible system
3.	Course-based formal and non-formal teaching/learning	Adults	Shorter or longer (degree) courses	On-line materials supplemented with traditional, printed (off-line) materials	“Learn-station” supplemented with traditional learning environment	Should cover all aspects of the learning process	Should cover all the three stages of the learning process Pedagogical value can be great

Table 1: Classification of e-learning approaches

For educational purposes such a model should be chosen that has an overall learning and teaching strategy. A system-oriented model that totally covers the three stages of the learning process, that is

- Transmission of knowledge
- Practice, application, consolidation
- Assessment of performance, feedback.

A well-designed model that does not mix up learning styles and adopt a patchy approach to learning (with printed text-books of linear structure and WEB-based e-courses) as Model No 2 can do.

A strong support system of interventionist-type is also needed as long as an “e-course” cannot answer independent learners’ most frequently asked questions:

- What should I learn?
- Why should I learn it?
- What aids should I use?
- How should I learn?
- When and at what pace should I learn?
- How well did I do?

In this case the danger of mistaking learner-centredness for learner neglect can be avoided.

In the above classification it is only Model No 3 that can satisfy these requirements. Obviously the design and introduction of such a system does not automatically provide a remedy for all our headaches. As there are questions learners frequently ask, there are questions practitioners frequently ask. Here is our list of the most burning ones. We kindly request our colleagues to share their experiences with us and propose solutions.

Practitioners’ most frequently asked questions are:

- Which on-line learning activities can best ensure interactivity?
- How much interactivity is needed in knowledge-, skill-based etc e-courses?
- What makes a learner’s participation in a discussion good?
- How should group participation in a computer conference be assessed?
- What are the symptoms of computer illiteracy?
- How could digitally functionally illiterate persons in an e-course be treated?

“The eLearning initiative has set the target that, by 2003, all pupils leaving school should be digitally literate.” (European Commission: A Memorandum on Lifelong Learning) This fact will certainly hasten the development and spread of e-learning. And if so, we should not go to class unprepared.

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THE DEVELOPMENT OF A WEB-BASED MASTERS DEGREE COURSE IN RADIOLOGICAL SCIENCES.

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Abstract

New communication infrastructures have enabled education to move from physical to virtual learning. Our goal was to convert a one-year master's course in radiological sciences for postgraduate radiologists from a traditional to a web-based learning environment. Structures were set up to facilitate this. A web-based format using multimedia to deliver synchronous and asynchronous learning to students has been developed using widely available software packages. Continuous assessment and mentoring were considered key elements of the conversion. Lecturers spent more time preparing course material than for conventional didactic teaching. However, it was felt that the avoidance of repetition, ability to assess lecturers and student performance compensated for this. Web-based delivery should facilitate recruitment of greater numbers of students and improved teaching techniques.

1. Introduction

There has been a dramatic increase in the use of computer-assisted education and in particular distance learning utilising web-based technologies. While traditional educational instruments such as the teaching file, textbooks, journals, lectures and conferences are still useful, the real demands of an increasingly complex healthcare environment diminish the effectiveness of traditional approaches. Physically distributed healthcare enterprise means limited access to resources such as teaching files and reference books [1]. Similarly, scheduling and travelling to lectures especially for remote learning locations continues to prove most difficult and expensive. It is the objective of this web based Masters Course in Radiological Sciences to provide cost effective virtual learning methodologies that allows radiological science students to participate in high quality synchronous and asynchronous multidisciplinary pedagogical resources regardless of distance and time constraints.

Radiological science is a constantly changing environment. New advances in technologies, clinical practice, safety regulations, image quality and viewing capabilities insist that the related educational practices are constantly updated and informed. The web compares favourably to that of original radiology educational software issued in standalone packages or CD-ROM format. These differences are outlined in Tables 1 and 2. [1,2,3,4,5,]

Table 1: Comparison of the traditional teaching model with the proposed web based model.

Traditionally delivered course	Web delivered course
Travel to training course	Course delivered to user
Limited locations	Multiple locations
Large break in service	No break in service
Huge cost factor for student and medical institutions	Costs only relate to student's educational resources
Little access to teachers	One-to-one mentoring – greater support
Little concession to mix of student background/ pace of learning	Instruction design focused on monitoring and implementation of remedial learning
Limited examples	Variety of examples
Learning format limited to printed texts and formal classroom	Multiple learning formats with text only a resource
No opportunity to review	All materials archived for review
Limited application of new information	Immediate application of new material

Table 2: Comparison of the stand-alone packages to web based educational tools.

CD-ROM (stand alone applications)	Web
Frequent expensive upgrading	New material updated easily, efficiently and cost effectively
Asynchronous learning only	Asynchronous and synchronous learning capabilities
Machine dependant (different versions for different machines)	Browser based applications run on a variety of machines

Typical instruction uses two sequencing methodologies, the first being the natural order implicit in the learning material. The second employs a sequence of performance benchmarks using learning hierarchies such as those found in Bloom's Taxonomy [6,7]. The instructional design can control the sequence and variation of the learning process. The intrinsic non-linear expression of the web, hypertext, allows for student control over what they learn and at what pace. By selecting their own path the student creates their own unique learning [8].

Learning structures developed using web-based electronic communication encourage student motivation. Communication is not restricted to a specific time and place and primarily the emphasis is on elements that are visual and textual rather than aural [8]. The multimedia capabilities emphasise visual learning environments, as core elements of radiological science deal with interpreting single or multiple images.

M.Sc. in Radiological Sciences

The one year M.Sc. in Radiological Sciences, offered by University College Dublin, has been in operation for almost 20 years and is amongst the first of such courses to be offered by a European University. It has been designed to meet the career needs of postgraduate Diagnostic Radiologists helping them understand the scientific background of diagnostic imaging. It aims to significantly improve their diagnostic skills and influence patient management. The established general goals of the course are that the student should understand the following regarding each area of application in the radiological sciences:

- Scientific Fundamentals
- Basics and Imaging Processing
- Equipment and Safety
- Clinical Applications
- Advanced Techniques

Each student is required to complete a thesis comprising of original research. The availability of this course on the World Wide Web is intended to promote access to advanced radiology education in remote learning centres. Current and projected applicants involve students from Europe, US, India, Asia, South Africa and the Caribbean.

2. Materials and Methods

A group involving members of the Institute of Radiological Sciences and the Mater Hospital IT department oversaw initial development. It included the Director of Information Technology Services, Professor of Radiology, Lecturers (some of whom had been previous students of the course) and a team of multimedia systems specialists. The involvement and training of faculty, administrators, staff and support services within the new technical framework were critical to ensure understanding and commitment. The course was broken down into a series of 12 modules and their corresponding objectives and allocated a learning time objective of 180 hours.

A pilot module was developed to teach radiation safety. A format was constructed which integrated the fundamental elements of content development and delivery, administrative functionality and student learning and progresses within a multidisciplinary environment. This format divides the distance learning programme into 3 sections - Instructional Design, Technology and Support. Six lecturing staff including medical physicists, radiologists and radiographers taught the pilot model. It had several attributes assigned to it:

- Time required to study
- Pre requisites
- Learning outcomes
- Lecture sessions - synchronous and asynchronous
- Assignments and exercises
- Case studies and examples
- Management and support

The module had been allocated a minimum student interaction time frame of 7 hours. A period of time was needed to acquire existing course materials and integrate the instructional design functionality.

Faculty was notified of the requirements to facilitate transfer to a new learning environment and given a specific time frame and necessary support to complete tasks. These tasks included:

Re-evaluation and presentation of outline goals and objectives for the course

- Compilation of existing subject material

- Updating of curriculum - in reference to instructional design formats
- Software training
- Proficiency in use of the web techniques - e-mail, search, new groups etc.

The course was designed to exist as an entirely web based learning environment. The framework format was a series of web pages built in HTML using a combination of Macromedia Dreamweaver, Microsoft Front Page, Fireworks and Flash. It was felt that the interface should be easy to navigate and provide the user with a feeling of confidence and familiarity. It should provide consistent and specific use of menu bars and navigation buttons, supporting integrated hyper-linking and cross-referencing to other points of information both within the site and to other web locations. A design template was created. It incorporated guidelines for suggested use of general elements such as backgrounds, fonts, colours, headings, and tables. Adobe PhotoShop was used for photographic and x-ray images where optimum reproduction was essential. The template for each session was clearly titled with a defined menu for consistent access to the variety of sections: topic overview, goals and objectives, lecture model, self test evaluation, session resources/references including web links, assignments, glossary and e-mail access.

Asynchronous lecture presentation utilised Microsoft PowerPoint incorporating Real Networks Real Producer Plug in for use with Microsoft PowerPoint 97, allowing streamed PowerPoint slides with audio narration [9]. Use of incorporated visual media elements within the presentation was emphasised to stimulate and motivate the student, helping to compensate for the lack of actual physical interaction. Long presentations (longer than 30 minutes) could be managed more easily if broken up into multiple shorter presentations. Training was provided for vocal and visual presentation, recording techniques and preparation of concise lecture scripts. Lecture scripts were made available to students as text with embedded hypertext linked to multiple reference materials, including glossary, associated texts, papers, short video and animation sequences, reference images, tables and charts. Published lecture scripts could be of benefit to those students with language or hearing difficulties who may wish to rely on and review text materials.

Synchronous lectures attempt to simulate the live classroom environment and require all participants to be online at the same moment in time. It was important that they be instructor led, where the teacher had levels of control over what events take place in the real time interactive situation. Conferencing technologies were evaluated in terms of cost and ease-of-use, server and client software, required hardware including audio and video capture cards, web cameras, microphones and bandwidth constraints. In the pilot model two primary virtual classroom technologies were tested, LearnLinc Classroom and White Pine's Classpoint. They both allowed that live lectures could be recorded and archived for future reference. It meant that the lecturers could review instructional presentation and assess levels of student interaction and learning.

A mentoring environment was created to increase pre and post-lecture access to instructors, stimulate the interchange of ideas and facilitate education support and guidance [10]. It relied on commitment from faculty and students to fully participate in consistent use of e-mail communication, newsgroups, and bulletin boards with the address of all participating users, students and lecturers made available. This work is time and date stamped, it allows for systematic and secure recording of submitted documents. A level of guided search was provided with appropriate web reference links provided for each session. Permission to access expert sites such as Dr. Hornak's Basics in MRI [www.cis.rit.edu/htbooks/mri/bmri.htm] was sought and at all times clearly marked and credit given.

Lecturing staff created self-test quizzes to correspond to each lecture in order that the student find criteria against which to measure his or her own performance [1]. It was found that commercial software such as Question Mark provided the optimum solution to this delivery. The server was set up that only authorised users could gain access. This allowed for levels of course security, student confidentiality and prevention of cheating and hacking (e.g. exam questions). Administrative functions provided a database that would record, monitor and assess user interaction. It was felt that this would be useful for students experiencing difficulties and aid student motivation. Course copyright required that it comply with current university legislation concerning intellectual property, in that all lecture material, work created by the learners and work stored on the site, where applicable will be the copyright of University College Dublin.

3. Results and Discussion

It is possible to deliver this structure of course using a web-based format. However, video conferencing capabilities had to be minimised due to bandwidth limitations within the current infrastructure. It involved a greater degree of hardware and software requirements and the greatest changes in teaching methodologies for faculty. As a result, evaluation in the pilot model was kept to a minimum, using only faculty that was most confident and skilled with electronic communications. Live conference that attempted to incorporate audio and video experienced severe constraints in effective teaching due to time delays in delivery and response. Buffering of streamed content and poor quality of image and audio created frustration in users. Synchronous activities that relied on text based communication and shared screen technologies that proved faster, more reliable and better served the learning potential.

Lecturers found that it took up to a five fold increase in preparation time for both synchronous and asynchronous lecture models, however, they felt improvements in lecture content, elimination of repetition and ability to monitor student progress, compensated for this. Lecturers were satisfied that existing tools such as PowerPoint formed key elements of the course. This saved preparation time and allowed lecturers to incorporate previously prepared material.

The perceived constraints of Internet technologies meant that the course was unable to rely on the web as the total medium of communication. Due to the many new technologies and education structures to be assimilated by both student and instructor it was felt that a pre-prepared package should be given to each user on registration. Elements included all relevant software/ hardware/ plug-ins, installation documentation, password and account privileges and e-mail addresses. Certain course resources such as large multimedia elements containing static materials will be placed on CD-ROM for alternative, faster reference that reduce long download times.

A learning curve was associated with the delivery of information through this remote media. Detailed planning of course structure, chronology and classification of delivery was identified as a major element in planning the web based delivery of such a course.

4. Conclusions

Web-based distance education has the potential to deliver a Masters course in Radiological Science to a wider audience than hitherto possible and forms a key element in the strategy for the future delivery of this course.

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EUROGEO – NETWORK OF EUROPEAN GEOGRAPHY TEACHER ASSOCIATIONS

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About EUROGEO

In November 1979 the Commission of the European Communities initiated a meeting, held in Brussels, of representatives of associations of Geography teachers. At this meeting it was decided to establish a EUROPEAN STANDING CONFERENCE OF GEOGRAPHY TEACHERS' ASSOCIATIONS, which later became known as EUROGEO. The goal was to help promote a European Dimension in the teaching of Geography in schools in Europe and to provide a forum for the discussion of matters that concern the teaching of Geography within Europe (Convey and Speak, 1993).

Initially, membership of the Standing Conference was restricted to "the countries of the European Community and their neighbours". At the 1994 plenary meeting of the Standing Conference, it was decided to widen participation to all the countries of Europe and to change the name of the association to EUROGEO. At the moment 27 associations take part in the Network's activities.

Activities

The principal aims of EUROGEO are to advise and promote the European Dimension in geographical education and teaching of the countries of Europe as a contribution towards the development of European citizenship. By doing so, EUROGEO encourages the development of a greater European awareness through the medium of Geography (Clary, Convey and Haubrich, 1998) and increases mutual knowledge and understanding of the countries of Europe (Convey 1992; Convey 1993; Convey and Nozen, 1997; Brock and Tulasiewicz, 2000).

The main focus of current EUROGEO activity has been to support and enhance the teaching of Geography and specifically the European Dimension in the classroom (van der Schee and van Westrehnen, 1996). EUROGEO has produced a large number of significant publications and has organised conferences for the Geography Teacher Associations of Europe on a regular basis. Representatives of all European Geography Teacher Associations are actively involved in EUROGEO. Each country, including associate EU member states and those covered within the Tempus agreements are represented in EUROGEO. EUROGEO also supports those countries and member associations who are seeking to develop official Geography teacher organisations and those that support the teaching of Geography (Convey, 1992; Convey, 1999).

Normally, EUROGEO reconvenes its participants every two years. Each meeting is organised, in rotation, by one of the member associations, in co-operation with the permanent Secretariat. The last conference was held in Luxembourg in November 1998. In September 2001 it will be held in the UK (Liverpool) and in 2003 in Bucharest, Romania.

EUROGEO has co-ordinated an **ERASMUS programme** "complementary measures" small research project. This was to discover the extent to which member associations of EUROGEO were promoting a "European Dimension in Geography Teaching" within their own national areas (Convey, 1997; Convey and Nozen, 1997; Convey, Meijer and Haubrich, 1997). The project took as its basic text the European Commission's concept of the "European Dimension in Education", as defined by the Education Committee of the Commission and reprinted in the Official Journal dated May 1988. EUROGEO has also regularly published extremely useful materials supporting geography teachers (EUROGEO, 1989; EUROGEO, 1991b,c; EUROGEO, 1992a,b,c,d; EUROGEO, 1993; Convey, Meijer and Vandenbosch, 1993; EUROGEO, 1994; EUROGEO, 1995a,b; EUROGEO, 1996a,b) and classroom materials about Europe, in partnership with the Geographical Association (EUROGEO, 1991a: Convey and Speak, 1993; EUROGEO, 1995c; EUROGEO, 1997; EUROGEO, 1999). These have all been disseminated in traditional formats.

Since 1999 EUROGEO has turned its attention to modern, innovative formats for its work. It has done this by considering the implications of using the Internet (Donert, 1997), multimedia (Convey, Kent and Jackson (1998) and communications technologies (Donert, 1998a,b; Donert, 1999). It is clear that spatial skills and geographical information on the World Wide Web are very important (Strobl 2000; Donert, 2000). The roles that classroom teachers play are being challenged by new eLearning opportunities. Those involved with the EUROGEO network are seeking to monitor and support these developments.

To support this, in early 2001, EUROGEO was awarded a three-year **Open and Distance Learning** (Minerva) contract by the European Commission to complete the project *EURO.GEO: Promoting the European Dimension through geographical education*. This project brings together a number of experts in Distance Education, a major publishing house and the EUROGEO network. The aim of this project is to research, then create and evaluate an on-line geographical resource to support the teaching of European Citizenship by Distance Education in secondary schools and to disseminate the project outcomes.

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BUILDING A WEBSITE FOR FLEXIBLE LEARNING – A WAY TO ENCOURAGE FURTIVE PROFESSIONAL DEVELOPMENT?

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Introduction

Mithögskolan's website for flexible learning was opened on March 21. The aim of the website is to provide information about teaching methods suitable for all kinds of flexible learning. During the months find of building it, we used two main guidelines: meeting *the information needs of the target group* and *usability*. We defined the target group as the stressed university faculty member, who quickly needs to academically sound and practical information. Our faculty members are not easily seduced by the web, so, we saw web usability as a principle for both content organization and screen design (Nielsen 2000). Our group of usability testers (Simich-Dudgeon 1998) triggered initial and we continue to upgrade. Here is a short list of issues at stake, our guiding principles and topics for discussion at the demonstration at EDEN.

Issues concerning webdesigner's vs. user's views

1. More than one information architecture for various access paths: The organizer's view of the home page as the main entrance vs. the user's need to get more than one entrance.
2. Quality of information balancing quantity.
3. Consistency of:
 - a. levels: number of clicks to the target
 - b. presentation style: colours, links, page design etc.
4. Economy – of user effort vs. wordage: How much written instruction/information to provide?
5. User decision-making: How much information is needed for the user to venture a click?
6. Empty vs. filled space: When is space restful, when stressful?

Our guiding principles

1. User experiences economy of time and effort
2. Clean graphic, uncluttered space (no underlined links, no "click here for more information")
3. No flashing software technology
4. Reduced wordage for hypertext, compared to linear text for paper.
5. Limited number of effective linkages and production of scannable text.
6. Content selected from these criteria:
 - a. Concisely written and easily applied in practice
 - b. Theoretically sound, a careful selection of refereed material, and library search guidance
 - c. Promoting productive and innovative learning

Topics for discussion: Using the website for professional development. How do we:

- shift from passive provision of information to greater interactivity by users on the site?
- keep this place safely 'furtive'? Many faculty teachers don't like to admit that they do not know much about info literacy, e-libraries, managing collaborative learning or, heaven forbid, abandoning lecturing!
- avoid information overload?
- know how the site is honestly being used/not used?

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DESIGN OF THE AYTEM LEARNING ENVIRONMENT: EDUCATIONAL & TECHNOLOGICAL ASPECTS

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Introduction

The AYTEM Learning Environment was designed while developing the DE course “Dealing with Change in Context of Educational Reform” in the process of implementation of pilot project “Accompanying a Young Teacher into Educational Market by Distance Course Module” under the frame of Leonardo da Vinci programme.

Educational requirements for the Learning Environment

Kolb’s cycle as model of the experiential learning process requires four types of the learning activities (concrete experience, reflections, conceptualization and active experimentation) and possibility to learn in a work place. The basic schema of content plans broadening of learning context: from personal, through professional and organizational to cultural, and requires extension of communication area. Stress on knowledge as the cognitive state that reflects the individual’s schemes or action models requires learning means that could stimulate cognitive processes. Understanding that the learning content appear in every new life cycle of the DE course in concrete cultural and educational context sets requirement of amend ability of materials.

The functional structure of the Learning Environment

Three main interrelated elements make the Learning Environment: a) Environment of individual learning (CD). The main learning materials as well as learning supporting means (tools, portfolio system, diary and learning means) are provided there. b) Environment of collaborative learning (LUVIT and AYTEM Web tool). It is used for the assurance of communication among the participants of the course and update of material. c) Working place: It becomes a source of practice.

Principals of navigation

Navigation is supported by navigational tree, toolbar and hyper textual organization of material. Structures of material distinguish three levels of material: overview level, task & exercise level and level of the learning resources (material and learning means). A Learner navigates inside individual and collaborative learning environments as well as between these two. Possibilities for individual trajectories of different learners are foreseen.

Learning Support & Assessment systems

There are seven functions of the system planned: learning, tutoring, technical maintenance, administration, teaching, management and creative authoring. The assessment system covers: focus on processes and results of learning, participation of all participants in the assessment; formal evaluation, monitoring and investigation of learning; special means of assessment and self-assessment.

Technological platform for the AYTEM Learning Environment

Technological platform is based on decisions about: multiple language (LT&EN) implementation; interactive tools (EVA, tool-book & HTML format), amend ability of materials on CD; On & Off-line regime and different scenarios for different technological infrastructure; integration of individual (CD) and collaborative (LUVIT) learning environments, WWW data bases of learning outcomes and learning monitoring system (AYTEM Web tool).

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NETWORKING IN FRAGMENTED KNOWLEDGE DOMAINS FOR KNOWLEDGE MANAGEMENT AND DISTANCE LEARNING

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In many Clinical Domains where advancements of technology introduce quantitative assessment tools and laboratories, there is a certain fragmentation together with a significant wealth of the relevant Domain Knowledge, due to its multidisciplinary character and the rapid evolution of the domain and to a certain lack of homogeneous skills among the involved professionals with significant differences among Countries and within each Country. A good example of this scenario is Motor Disability Assessment (MDA).

In order to improve the quality of services provided by the healthcare system in these sectors of Medicine, it seems appropriate to act at two different levels:

1. at a scientific level in order to a) to organize and keep up-to-date the relevant *corpus* of knowledge that is distributed in different sectors of Medicine and Engineering (in particular Bioengineering, Informatics and Telematics); b) to standardize protocols and patient assessment methods; c) to allow the communication of comparable data and information; d) to guarantee the quality of the results and the competence of the staff devoted to the analysis and interpretation of the results. In this context a preliminary consensus creation on the guidelines is a fundamental and recursive step.
2. at an educational level in order to allow learning and diffusion of competences and skills able to support the implementation of Best Practices among professionals that will be involved, (or that are already involved) in the laboratory activities. Typical users of the healthcare system in the case of MDA are supposed to be: psychiatrists, physical therapists and bioengineers.

In the MDA domain, an increasing number of Clinical Movement Analysis Laboratories (CMAL) is being established world-wide, and particularly in Europe, for the purpose of the Functional Assessment (FA) of motor disorders. Number of CMALs would take advantage from the availability of clear guidelines for proper operation and effectiveness of the lab as well as from education that might enhance the competence of their personnel.

The experiences of ABCMALE and MODASPECTRA projects apply to this context: the first one was devoted at the establishment of an accreditation system of the CMALs and addressed the management of the relevant domain knowledge in order to define and to disseminate the guidelines for best practices; in this manner ABCMALE should enhance CMALs' quality procedures and possibly their outcome.

The second project was devoted to the education of various professionals in MDA by web based ODL. The contents embedded into the MODASPECTRA learning objects are coherent with the Best Practices identified in ABCMALE. The two systems represent complementary aspects of the same bulk of knowledge so that users of ABCMALE system should apply in practice the knowledge acquired through the MODASPECTRA learning system.

The networking of these two systems should enhance the training of MDA professionals that can be evaluated, according to Kirkpatrick's taxonomy, at the reaction and learning levels through MODASPECTRA and at the behavior and, possibly, at the results level by ABCMALE.

Both systems are based on the same basic communication model, consisting in a web-server backed by DB servers. They promote co-operative working (CW) among the relevant actors by means of suitable CW tools. In particular ABCMALE developed a system based on multi DBs for the creation of consensus about the definition, adoption and updating of good practice guidelines; MODASPECTRA used CW tools for the production of the learning objects and their integration in the system that allow their remote delivery to the Long Life Learners. These latter are also provided with suitable communication tools for a remote dialogue among them as well as with the teachers and tutors associated to the various Modules of the system, that implement co-operative learning.

ABCMALE and MODASPECTRA systems are available at the following URLs (respectively):
<http://abcmale.ee.unian.it> and <http://www.modaspectra.ee.unian.it>.

THE HOSPIWEB PROJECT - EVALUATION OF "JUST-IN-TIME" STUDENT INTERACTIONS

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Abstract

The Hospiweb Project is a collaborative venture sharing educational materials and technology between two Institutions of Higher Education, Glasgow Caledonian University, Glasgow and Queen Margaret University College, Edinburgh, in Scotland. Students from the two universities make use of the commonly developed educational environment of the website. A major component of the learning experience is made up of activities which require distantly located groups of students to interact in teams. NetMeeting is the platform that supports the communication amongst these groups of students and allows them to meet via desktop-videoconferencing (DVC), interact on real time via chat facilities.

Most of the research on the role of lecturers in computer mediated instructions has concentrated on the support mechanisms given to students within asynchronous (different time, different place) learning environments (Mason 1994; Libotton 1994). One of the main educational benefits mentioned by this body of research is the reflective and self-reflexive quality of student interactions. These result from the shared experiences of students in their participation in electronic conference spaces and electronic distribution lists (McCreay and Brochet, 1990). Students who might have problems in face-to-face seminar environments can blossom in this forum because there is no jostling for space to participate; students go to the forum in their own time and there is time for reflection prior to participation.

This is the exact opposite of communications facilitated through synchronous (same time, different place) GroupWare. Students are developing documents, making drafts and discussing issues in real time. Although they are located at a distance from each other, their communication is synchronous using the chat, whiteboard and desktop-video-conferencing facilities of GroupWare. All these require real time responses. Immediate responses are required from group members for the communication to proceed and immediacy of response seems to be a primary characteristic for a satisfying synchronous interaction.

However our preliminary observations in teaching NetMeeting suggest that not all students are capable of responding to the demands of other group members at the same pace. Asymmetrical responses by some students to the requests of the group can slow the learning experience of the whole group. Very slow response rate is a learning problem put in evidence through the use of these technologies. However, it is not a technical problem - it is a human problem highlighted by the use of technology. There is clearly a role for the lecturer in detecting these asymmetrical responses and in ensuring that the learning experience for the individual and for the group are not jeopardised. Observations of student participation in groups suggest that the role of the lecturer should be focused on the early monitoring of individual student performance as a part of the group. A lack of group processing skills and reliance by some students on "lecturer-driven" rather than "student-centred" learning is in evidence. Despite having developed initial familiarity with the website and the GroupWare facilities within NetMeeting our experience suggests that the students have yet to see and internalise the significance of the technology in helping them learn collectively.

A number of on-line spiral, competency based work-book format activities have been developed which allow students to demonstrate competence acquired and submit evidence of work performed for the group. This paper presents an evaluation of this stage of the project. We are calling this form of evaluation "just-in-time", because it is through completion of the work-book activities that the student demonstrates competence and gives evidence of the time necessary for the development of certain competencies crucial to group-work interactions.

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NEW MODEL OF ELECTRONIC BOOK FOR DISTANCE LEARNING COURSES

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Abstract

Structure of electronic book, prepared as auxiliary materials for Distance Learning courses will be described. Undertaken Assumptions and their grounds will be presented. Model of a single lecture, monitoring of student progress and technique of movement through the course content will be described shortly.

1. Introduction

Education is a complex and multi-element process. Well-known, traditional tools used in the learning process based on face-to-face contacts between lecturer and students, such as lectures, design and accounting exercises, laboratory training are still of great value. Similarly, text-books, manuals and lectures are useful in the self-education process.

The necessity of development of new techniques has become evident together with the dissemination of education and the development of Open and Distance Learning systems. Fortunately, new multimedia technologies and Internet make it possible to prepare didactic materials in a useful form facilitating material study by learners [1,2,3].

Warsaw University of Technology is preparing a new model of studies using internet technology. That is why the works concerning preparation of a new model of electronic book that uses existing possibilities have been launched.

2. Basic assumptions of electronic-book model

Analysis of needs and possibilities was made during preparation of the model design of course materials, some assumptions were also undertaken [1,2].

First, it was assumed that the course material would be provided in an electronic form on CD. It would give students the possibility of studying course content without restraint. It was also assumed that material would be published by the use of information service accessible on-line.

Moreover, it was assumed that the material in electronic form should be transferable between many system platforms. Reproduction (playback) of material should be done by the use of non-commercial software. Tools for review of course content should be provided together with the material.

Furthermore, it was assumed that the form of the didactic material should ensure the highest interaction degree for the user.

Taking into account the above-mentioned assumptions and experience of other teams preparing materials for distance learning [2], it was assumed that didactic materials would be developed in the form of HTML documents. Programming language JavaScript would be used for dynamic management of the content of created documents.

It was noticed that authors of didactic materials preferred mostly MS Word editor and used it to prepare documents. It was decided to use MS FrontPage programme to facilitate document conversion from MS Word format to HTML. By the use of FrontPage a template of e-book would be developed for material presentation.

Lecture material would be enriched, according to the possibilities, using pictures, animations, sound comments, multimedia presentations, questions and tasks with keys or without key. Beside basic lecture material, according to the possibilities, auxiliary materials in the PDF documents form (review possible by the use of free Acrobat Reader Program) would be provided.

CD-ROM containing lecture and auxiliary materials would be provided with HTML browsers (Netscape Navigator and Internet Explorer), Acrobat Reader and, according to the possibilities and needs, applications for reproduction of multimedia files.

Such material after preparation would be published by the use WWW service accessible through educational portal.

3. Structure of Electronic-book

The material, in terms of functional aspects, is divided into three main parts:

- Introductory Part
- Lecture's Part
- Auxiliary Part

Introductory part contains large amount of information of different kind but needful and useful. It is a kind of introduction enabling student to appropriate lectures as good as possible. The content of Introductory Part may be subject to changes, depending on needs. The following elements are assumed to be included in this part:

- **Information about authors.** It presents the authors of didactic materials, their professional profile, especially professional experience and didactic knowledge.
- **Course purpose.** It is formulated and prepared by the authors. It presents level of knowledge that students should acquire (according to the authors' intentions) after the study of prepared material.
- **Requirements concerning credit for a course.** It is specific for a given course, when it requires a final exam..
- **Requirements for equipment** and description concerning the way of CD use. They are a set of hints and instructions prepared by IT specialists.

Lecture's Part contains series of didactic units that can be called lectures. It is assumed that each lecture is a separated unit, basic course quantum, specified entity that student should learn on his own..

Next, it was assumed that a lecture is composed according to a given schema and it contains many essential elements [2]. The elements are as follows:

- **Basic knowledge segments** contain didactic material that should be learnt by students. Understanding of materials and lecturers' contents can be facilitated and hastened using auxiliary multimedia tools containing written comments, audio comments, simulations and animations, video insertions, etc. Use of auxiliary multimedia tools differentiates an electronic-book from a written text-book. Simple scanning of written-book pages and their presentation on a computer screen does not automatically create a new kind of a manual.
- Questions, problems and tests for **self-evaluation** enable a student to assess his knowledge and understanding.
- **Glossary** and subject matter index contain a list of terms and definitions introduced into a given lecture.
- **Bibliography** contains a list of most important items (book chapters, scientific and technical publications, information contained in Internet, etc).

Auxiliary Part can contain different elements, according to the course subject matter. However, the three components listed below should be included in this part as they play an essential role in the education process:

- **Index** of all new definitions and terms introduced in subsequent lectures.
- **Library** of materials and publications (basic materials, mentioned in the subsequent lectures, as well as extra references) .
- **Auxiliary software** attached in this part can facilitate to read certain texts, animations, to do simulation calculations or to prepare simple projects.

The most important elements were considered in the assumed model of electronic-book and their list could probably become longer. However it can now be seen that the number of tools used in such electronic manual exceeds considerably anything that authors of printed manuals can invent or introduce.

4. Pages construction and navigation through the manual

Prepared electronic book was built in the Dynamic HTML technology: HTML, Cascading Style Sheets, Java Script. Thus the whole navigation is based on HTML references and dynamic processing of WWW pages by Java Script. After placing the mouse pointer on a reference, a given text is dynamically underlined. Functionally, navigation is a result of a book organisation.

The **first navigational level** is an opening page. Information about authors and the first page in a book can be called up from this page. In each case a new window is opened.

The first page of a book is the **second navigational level** and it enables students to enter any single page, namely: the user introduction (explaining how to work with a book) and the table of contents. Pages containing information about authors and user introduction how to work with a book are the Introductory Part.

The table of contents is the **third navigational level**, it enables to enter particular lectures and the index.

A lecture is the **fourth navigational level**. It is impossible to switch from one lecture to another without return to the table of contents. The table of contents and lectures (containing materials, problems, list of terms and bibliography) are the Lecturer's part.

Structure of a lecture is based on the assumption that it is a separated unit, specified entity, that student should get to know. The lecture contains the main contents of a manual. The Upper bar informs about the number of a lecture and its title. It contains references to the table of contents and **book-marks** enabling to open each of functional unit index that is opened in the new window. Book-marks contain titles of functional parts.

The left bar of WWW page changes according to the actual functional part. Common element for all parts is a **book icon** with a question mark that is the reference to the index. For materials the left bar will contain references to the segments. For the current segment references to its screens are specified.

In the part **Problems** the left bar can contain the references to particular problems, tasks and tests. For dictionary and bibliography the left bar does not have dedicated content. For preparing materials it was assumed that users have the minimum resolution of a screen 800x600 points and they work in a full-screen mode to acquire materials. The result of the assumption is to assume that the essential content will be presented in a very small degree in a format of 600x500 points. These assumptions are reflected in the organisation of presented material.

The lecture material was divided into segments, for the purpose of acquiring knowledge more easily.. Each segment is a single HTML file. For the purpose of easier orientation and navigation, segments are divided into agreed screens being the smallest basic organisational units of a lecture material. At the beginning of a page, the title of a segment is placed then further screens with their screen titles are placed. The segment title and screen titles are HTML references. Important messages are brought into relief by the style or colour of a font.

Lecture material is rich in illustrations. Illustrations occur in the different configurations. Single illustrations with descriptions are the basic form. Pairs of illustrations (arranged horizontally or vertically) with a common sign below also occur. Larger sets of illustrations with a common sign occur seldom. Often the size of readable illustration is too big to be placed on one page. In such case the miniature of illustration is put in the page and it is the reference (distinguished by the use of colour frame) to the new window filled only with the illustration. Each of illustrations is opened in a separated window.

5. Summary

For preparation of a model of an electronic book it was assumed that a student has contact with the lecturer during the studies. However, the contact is not sufficient to master the study material and

students should work on their own to enlarge their knowledge and improve their understanding. Electronic book is prepared as a tool for self-education and it should help students in this work.

Periodic contact with a lecturer by the use of Internet and electronic mail can be of assistance in the studies of the material. The contact can be used to send questions and messages, to receive comments concerning tasks and tests being solved.

Disc CD with such prepared material can be used successfully instead of materials printed for courses, seminars and postgraduate studies. It can decrease the number of lecture hours, skipping most of learning process for self-education.

Labour consumption for preparation of an electronic book is much bigger than for a book or sets of lectures written using traditional printing technology. It requires the work of multidisciplinary team and a high level of appropriate experience.

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REFORMULATING VOCATIONAL TRAINING AND CONTINUOUS EDUCATION FOR MEDICAL PERSONNEL USING INFORMATICS AND INNOVATIVE MEDIA

InfoNovaMCT

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The pre-accession strategy for CEE universities

The pre-accession strategy for CEE countries imposes an accelerated rhythm for our universities in reformulating the educational strategies in order to align as soon as possible to the European educational requirements. For the regulated professions of health care the necessity of harmonisation of the continuous medical education curricula between the CEE countries and EU is not only an important problem but is also very acute. Despite all politic disputes the health system reform in CEE countries is advancing bringing to our graduates new problem to face with: family medicine, health insurance, private medicine. Face with this problems the wider objective of our project is increasing the training level of CEE countries doctors and nurses (Romania and Hungary) by the adoption of EC regulations for the profession of doctor and by the adaptation of high technology for the teaching techniques in medicine.

In Romania Universities are directly under the Ministry of Education and are state owned but self-governing. Regulations of the Ministry of National Education stipulate the way of the implementation of the continuing education in the Romanian Universities, giving a flexible framework for the organisation of distance education by the universities themselves. The political educational priorities focus on provision of distance education from conventional universities.

Within the framework of the medical education, the Distance Learning takes a particular form, that of the “Adults Education”, having as main reasons, the following:

- To meet demands-those of the physicians in a postgraduate training programme preparing a medical speciality.
- To meet specific needs – those of the physicians requiring a periodical postgraduate training for qualification in new medical specialities, in new competencies, with new procedures and for updating knowledge regarding new regulations, etc. – they are programs of continuing medical education at a distance.

It is the normal form of training provision for physicians who are isolated, for those who are to distant from the Universities that provides the particular course they need, for those who can't leave their patients. The National Council for Academic Accreditation and the College of Physicians accredits all of them.

This needs was identified in the framework a feasibility study for the establishment of a regional network for continuing medical education by distance learning.

InfoNovaMCT is a response to the these needs having the following objectives:

- Improve the skills and competencies of people facilitating their integration into the labour market
- Improve the quality of continuing professional training which leads to increasing the flexibility to adapt to changes in organisations and in technology.
- Improve employability by adapting and reformulating continuous medical education, by decreasing of the number of young jobless people leaving the education, by developing of new skills and competencies linked to the information society and the promotion of language skills in order to facilitate mobility.

- Improve partnership by development of work-linked training and bridge-building between initial and continuous training.
- Improve social Inclusion promoting the flexibility of training and contributing to the inclusion of disadvantaged groups in the labour market.
- Improve adaptability by the introduction of new technologies and by the development in consortiums of the new skills and competencies in ICT
- Improve the use of new technologies by the development of the necessary skills for the pedagogic use of ICT and its potential in vocational training actions and products at all levels and types of training
- Improve transparency developing new methodologies of assessment, certification and validation of the competencies acquired in work situations and, in a more general way, outside formal training systems, in close co-operation with the partners concerned: Insurance companies, national professional associations.

In order to achieve these objectives an appropriate transnational partnership has been designed, including Training Centres, Enterprises, Professional Associations and Social Agents.

The proposed aims could be:

➤ **Development of an evaluation environment for continuous training in Health care.**

The consortium will start an evaluation of the local and regional formation needs using questionnaires addressed to the health authorities, comparison of health management law in order to promote the new teaching models in the CEE countries. The direct results are databases used for health model comparison that will be used to sustain the scope of the project to the national educational representatives and for the dissemination of the project to other medical faculties.

➤ **Harmonisation of the continuous medical education curricula between the CEE countries and EU**

The CEE medical schools curricula is still overcharged and is not orientated to a modern curriculum framework based on a core curriculum and special study modules like in most EU universities. This action is using questionnaires to assess the sum of knowledge (credit accumulation) needed for a continuous training graduate in EU and CEE countries for comparison. The direct results are databases for model comparison that will be used to define the CEE graduate profile and to sustain the scope of the project to the national educational representatives.

➤ **Implementation of a new credit transfer system adapted for the continuous medical education**

Based on the adopted model each partner university will define a modern curriculum framework for continuous training profile adapted to the local, regional and national needs. Each partner CEE University and Social Partner will adopt the modules based on the local and national needs. Each partner will produce a new curriculum based on a fine definition of the knowledge, skills and attitudes appropriate to a particular stage in educational process.

➤ **Validation of the elaborated models**

➤ **Adopting new teaching strategies and methodologies**

The partner CEE universities and social partners have to adopt the new teaching strategies and methodologies emerging from the project experience: problem based learning, student-centred orientation, ICT based training, European language classrooms, inter-cultural modules.

The goals and objectives of continuing medical education will be:

- Acquiring knowledge and understanding of health promotion, disease and its prevention and management, in the context of the whole individual and his or her place in the family and society.
- Acquiring the basic clinical skills

- Acquiring and demonstrating attitudes necessary for high standards of medical practice
- **Reviewing the role and development of information management and technology in healthcare professional's training**
- **Considering how information can act as a catalyst for change, and what individuals and organisations can do to assist this process**

In the partners CEE universities the project will introduce the Clinical Skills Centre as an independent teaching unit.

The activities are:

- Evaluation of the local and regional medical formation needs
- Self-evaluation of the student selection systems
- Evaluation of the sum of knowledge needed for a graduate
- Evaluation of the quality of teaching
- Finding the best model based on the evaluations
- Europeanisation of the graduate profile for the CEE countries
- Europeanisation of the medical faculties profiles
- Validation of the elaborated models
- Curricula harmonisation
- Adopting new teaching strategies and methodologies.
- Comparison of teaching resources; Adaptation and elaboration of new teaching materials
- Pilot sections using the EC models
- Study period recognition
- Agreements for the credit transfer system
- Implementation of double and common diplomas
- Reciprocal diploma recognition
- Dissemination;
- Extending the consortium
- The partner CEE universities and social partners have to adopt the new teaching strategies and methodologies emerging from the project experience: problem based learning, student-centred orientation, ICT based training, European language classrooms, inter-cultural modules.
- In EU, internationalisation is seen as part of general education and is more directed towards globalisation of the curriculum. Over the last few years, internationalisation has become a key concept for the development of higher education institutions in eastern European countries. Economic conditions represent a major constraint for student and teacher mobility from Eastern Europe. The development of the new communication technologies and language skills, make possible the development of academic exchanges and joint projects in the areas in which mutual cooperation might be strengthened. By the globalisation of teaching process, local and regional knowledge needs to be known far beyond its places of origin. Flexible and resource-based learning are more easily adapted and used than were fixed curricula and institutional traditions. Credit recognition and transfer, offers new opportunities in the international under and postgraduate training on each side of the ocean.
- The continuing education supposes the transition from traditional to virtual teaching technologies. The key points are:

- Need for universities to define clear policies and strategies vis-à-vis Information and Communication Technologies
- Changing role of the teacher
- Development and adequate telecommunication infrastructures
- Access to Internet and to databases for educational Institutions
- Promotion of library technology developments

In Romania the political educational priorities focus on provision of continuing education from conventional universities. They use full time staff that specialises in distance education and works both in conventional and distance teaching. They are although the designers and readers of the most part of learning support materials. Sometime, Universities employ external staff for these activities. A number of conventional Romanian Universities have interests in Internet based continuing education programmes, but most of these are more at the project development stage. Some of these Universities are technology-rich and are developing courses and course structures for the World Wide Web.

For the CEE universities priorities are:

Consolidation of efforts to support HE reform:

- a) Implementation of institution wide modular and credit accumulation system
- b) Development of procedures and mechanisms for institutional quality assurance of the teaching provision.
- c) Development of skills necessary for the pre-accession strategy
- d) Adaptation of education to the European directives in the field of so-called Regulated Professions.
- e) The improvement of educational/training framework
- f) Development of training/re-training that can satisfy the requirements resulting from the approximation of legislation between CEE and the EU.

The new technology applied to education has substantially increased the scope for self-learning. Many imaginative and highly successful programs have been developed in a variety of forms. For the new curricula universities have to produce study guides in printed and electronic format. Using the present project background the consortium universities will act for the implementation of double and common certificates and diplomas and reciprocal diploma recognition.

The partner institution will produce a book named “Guide for good practices in the europenisation process of CEE universities”. The objectives of the dissemination envisage primarily the national decision-making bodies (National Accreditation Commission and the concerned Ministries, professional associations and labour unions in Medicine, and also all institutions directly or not-directly involved in Medical Education (universities beyond the consortium, non-governmental organisations involved in the internationalisation of the educational process, enterprises of software and didactic tools release).

The design of the present project was supported by a multi-lateral collaboration with the CEE universities from the consortium. These relied on the implementation of institutional structures indispensable to the pre-adhesion to the Community regulations.

The EU universities from the consortium, played the role of models, know-how, evaluation and validation in the above-mentioned projects; this way it is insured the continuity in the accomplishment of the strategic plans agreed between the universities from the West and East.

Maybe our situation is the same with a new art gallery owner. He design the building, he put carpets, he hire the personal, he made the place for paintings, chose the light, everything is perfect. What he has to do to have a great gallery art?

First he has to choose the paintings. Of course, he has to know what people enjoy. So, until he knows that he will put his own paintings, which he already had. But in very short time he has to “train” the painters to paint good paintings, to be useful for his gallery. His scope will be that finally to have some great paintings.

But the value of one gallery is not given just by the value of the paintings that are inside. The value of the gallery is given too by the people that enter into, by their opinion. So the owner has to make the publicity to the gallery, and as well, to be shore that people enter into his gallery.

Could “**InfoNovaMCT**” arrive to be a really useful tool in continuing medical education by distance learning ? Could it provide a good framework? I hope that it will! Only the time has the answer.

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INFORMATION TECHNOLOGY PROJECT IN SMALL AND MEDIUM SIZED ENTERPRISES IN CENTRAL FINLAND

Timo Ovaskainen, University of Jyväskylä, Information Technology Research Institute

Introduction

When educational organizations and companies are thinking how they should enter the e-learning business, they need to find out their basic processes and which of them can be done online.

The poster has two aspects. First, it will show the basic goals and actions of the project "Intoke – Information Technology in Small and Medium-sized Enterprises". Second, there will be a demonstration of the Genre-based method that has been used in the organisations' consulting process.

Intoke -project

Intoke - "Information Technology in Small and Medium-sized Enterprises" – is an educational technology project for the small and medium-sized enterprises (SME's) in Central Finland. The objective of the project is to develop and support the use of information and educational technology. The project is mainly funded by European Social Fund (ESF). The poster focuses on theory-in-practice and best practices developed during the project in 1999 through 2001.

The project has five main tasks – training, research, consulting, technical support and technical testing and development. During the basic training companies have a possibility to get information e.g. about the latest services in the Internet or the use of videoconference. Customized training focuses more to an organisation's own needs. The research in Central Finland and in the companies has been made to understand the local situation. The consulting process supports the companies to make strategic plans for the future activities. Technical support e.g. administrates the web based learning environment TopClass. Finally, the project scans all the time the latest technologies in the educational technology area, and share its with the participating companies.

Genre-based method in the consulting process

The goal of the consulting process was the create strategies for the future. In this process we used a Genre-based method (1.) It shows the flow of specific processes in a diagonal matrix. This modeling method is usually used for Information System Planning purposes in organizations.

Information Technology Research Institute

The Information Technology Research Institute (ITRI) is one of the University of Jyväskylä's real research institutes. It focuses on business driven research and development services in the information technology area. ITRI is responsible for the industrial research services provided by the Faculty of Information Technology. ITRI studies applied information technology and promotes research results and new technologies available for the business. It develops solutions for the specific needs of it's collaborators as well as methods with a wider range of applications.

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INTEGRATION OF ADULTS WITH DISABILITIES INTO LABOUR MARKET THROUGH OPEN AND DISTANCE LEARNING

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Introduction

Significant changes occurred in social policy in most of European countries in last several decades. For a long time the society looked upon the disabled as helpless, worth to be sympathised. It was considered that only in exceptional cases disabled persons could adjust to the real life environment. Therefore special care must be arranged and particular conditions arranged for them.

In the 1970th idea of social integration emerged and a new perception of a disabled person was established. People with disabilities undoubtedly face a wide range of obstacles which prevent them from achieving full economic and social integration. The concept of integration is based on the inclusion of the disabled into society. According to this concept disabled persons must be treated as equal to healthy people, only being seriously ill or experiencing the consequences after serious and hard illness or trauma. The biggest obstacle preventing them from active participation in society is the surrounding environment which is not adjusted to their needs - legal situation, buildings, transport, education system, psychological factors. Concerning psychological factors it must be stressed that disabled persons are not yet ready to be integrated and society is not yet ready to accept them as equal.

The society must provide additional opportunities for the disabled people to get integrated into the society. The environment must be created which would encourage and stimulate the disadvantaged people for personal, professional and social self-realisation. Proper functioning rehabilitation system should include preparation of legal acts, medical rehabilitation, professional rehabilitation, education, technique of rehabilitation, adaptation of environment, culture, sports, leisure time, information, transport system service, social care and other social services, training of specialists, medical social expertise.

Project ADIS - Integration of Disabled Adults into Labour Market through Open and Distance Learning - is directed to implementation of social integration concept using distance learning methodology and technology. Presentation of this project is made here on behalf of the project Consortium and special acknowledgements are expressed to all partners.

ADIS project

Pilot stage of the project ADIS started on September 1, 1999 and was finished on August 31, 2000. Project has been carried out with support of the Commission of the European Communities under the SOCRATES programme. Aim of the project was integration of the disabled people into labour market by combining motivation by adapted physical activities and distance training. Project was executed by 11 organisations from 6 countries. Project co-ordinator was Kaunas Regional Distance Education Centre at Kaunas University of Technology. In this first stage project partners were:

- Lithuanian Academy for Physical Education, Lithuania
- Lithuanian Labour Market Training Authority, Lithuania
- Utena Medical College, Lithuania
- Panevezys Day Centre, Lithuania
- Kielce University of Technology Centre for Continuing Education, Poland
- Riga Technical University Distance Education Study Centre, Latvia
- Republican Rehabilitation Centre, Latvia
- National Distance Education University, Spain

- Castel-y-Dail Telecentre, United Kingdom
- University of Limerick, Ireland.

First year of the project was successful and all goals have been reached. Partners agreed on continuation of the project for dissemination of results and extension of the scale of activities. Proposal was accepted and work will continue (see below).

Project methodology and outcomes

All project activities were carefully planned, discussed in kick-off meeting and plans accordingly adjusted. One can easily distinguish two main strands in the project - motivation and training. These two strands were melted into one common goal and project methodology was directed to achieve it.

Social integration of the disabled is directly related to their integration into the labour market. The integration into labour market directly depends also on one's professional knowledge and skills. Therefore vocational training is to be considered as an important precondition for the social integration of the disabled. Empirical research was performed to identify user needs. Questionnaire was prepared and distributed among disabled people in partner countries. Results of this research were used in further studies and course development.

Another important issue is motivation of disabled people for integration. It is recognised that physical activities could be used for this purpose. Research was performed on "Socialisation of disabled people by motivating them for adapted physical activity". Review of scientific literature and foreign experience in the area of socialisation of disabled people by motivating them for adapted physical activity was done. The recommendations referring to the situation in Lithuania were suggested and results were discussed in workshop in University of Limeric.

Based on foreign experience and review of special literature study was made on "Specifics of Open and Distance Learning for the disabled people". Results on user needs analysis were taken into consideration too. Special workshop was organised to discuss results of this study. Distance learning methodology for ADIS courses was developed on the basis of this study.

At the final stage ODL course "Basics of computer literacy for disabled people" was developed. It consists of interactive multimedia CD-ROM with self-assessment as well as printed Student Guide and Tutor Guide. Course was piloted in Latvia, Lithuania and Poland. Evaluation of piloting was performed and it revealed some differences of results in different countries, which must be clarified in future research. General conclusion was that disabled people are satisfied with combined training programme consisting of physical activities and IT training. Both Studies and course Guides were translated in project partner languages and disseminated in partner organisations.

Future plans

Results achieved in the first year of project ADIS were well accepted by partner organisations and willingness to continue was expressed. For the second stage of the project additional particular objectives were set - create opportunities for adequate self-marketing for people with disabilities and help them to integrate into the information society. Particular situation is in small cities and remote districts where new technologies could be extremely effective while overcoming social differences, providing possibilities for taking active social roles.

At the second stage of project following new partners joined the team:

- Royal institute of Technology, Sweden
- Scottsu Consultants LTD, UK
- Joint Conception Studio, Lithuania

While disseminating achieved results and taking into consideration the results of the evaluation of the outcomes, the second project development stage will deal with further packages of integrated measures including guidance and counselling, support for self-employment, work experience schemes etc. For the second stage of the project lasting from October 1, 2000 till August 31, 2002 there are outlined the following objectives:

- The development of web based virtual community for disabled people. Internet based videoconferencing equipment will substantially reduce obstacles encountered by disabled people.
- Preparation of the study “Behaviour model for the disabled” which will be translated into partners’ languages.
- The development of ODL course “Basics of computer literacy for the disabled” in Latvian, Polish, and Spanish. The course will be an integral part of the virtual community network. Dissemination of the ODL course among organizations of the disabled and the authorities responsible for the training.
- Development of the videotape called “Opening up Opportunity with ODL” (in English with partners’ language subtitles). There will be presented ODL advantages for people with disabilities who want to learn but don’t have possibilities to attend regular studies. The videotape will be distributed to the public authorities responsible for the social integration of the disabled people.
- ODL course “Introduction to computer based design packages” will be developed and piloted in partner countries. The course will teach disabled to use different editing systems and will assist in enabling people with disabilities to participate fully in society by removing barriers and encouraging their self-realization
- Project materials will be translated, printed and disseminated inside the partner countries, through the national and international communication networks.

Conclusions

First stage of the project ADIS - Integration of Disabled Adults into Labour Market through Open and Distance Learning - was successful and follow-up is on the way. Project is carried out with support of the Commission of the European Communities under the SOCRATES programme.

Two Studies have been performed in the project - "Socialization of People with Disability by motivating them for Adapted Physical Activity" and "Providing Distance Education for the Disabled People" as well as ODL course “Basics of computer literacy for disabled people” developed.

Disabled people are satisfied with combined training programme consisting of physical activities and IT training. Studies performed in the framework of the project and course Guides are translated in project partner languages and disseminated in partner organisations.

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MULTIMEDIA DISTANCE ENGLISH COURSES AND LEARNING MANAGEMENT SYSTEM IN THE FRAMEWORK OF LEONARDO DA VINCI PROGRAMME

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Introduction

Recent development of the information technologies has been reflected in the rapid increase of interest in using computers as an educational medium for language teaching and learning. Out of variety of Computer Aided Language Learning (CALL) techniques, the integrated multimedia Internet based technique plays the essential role.

Therefore the objective of this project was to design and develop multimedia online English courses in order to meet the challenges of modern education. The Internet based English courses are aimed at facilitating and widening students' opportunities of flexible language learning and to provide them effectively with a specialised knowledge of a foreign language.

The title of the project is: „Multimedia Distance English Courses for Polish Users in Legal, Banking and Finance, Science and Technology, and Safety Training Sectors with Elements of European Union Regulations and Standards” (Pilot Project N°: PL/98/1/86519/PI/III.1.a/CONT). The dominant project's priority is: generalising access to skills and promoting the development of vocational skills through the information society in the context of lifelong learning. In the project the goals have to be fulfilled in the time scope of 2 years which is until July 2001.

Partners

There are British and Polish partners in the project:

- Poznan University of Technology (PUT) is the contractor and coordinator of the project. The main responsibility of this institution is to provide the content of the thematic English courses and partial linguistic and methodological verification¹, and to manage project: organise meetings, ensure information flow among the partners, design the multimedia laboratory, and organise pilot courses.
- Technical University of Gdansk (TUG). In the scope of the project TUG takes part in the implementation of content material, carries out market analysis to indicate target groups for the product, and organises pilot courses at TUG.
- Institute of Communication and Information Technologies (ITTI) is the only SME partner in the project. Within the project ITTI participates in the technology thread: it is responsible for development of distance learning management system, and multimedia implementation technologies, provides source materials for technology oriented modules.
- University of Wolverhampton (UofW) is the British partner in the project. In the project UofW provides the expertise on the European Union standards and regulations, and linguistic verification of the content.

¹ partial linguistic and methodological verification has been provided by Prof. W. Sobkowiak, Adam Mickiewicz University, Poznan, Poland

Products

The product of this project consists of:

- Educational package for English learning,
- Software system for Distance Education.

Content Description

Educational package consists of six multimedia specialised English course modules accessible on the web. It is aimed at improvement of the participants' practical knowledge of a foreign language and enhancement of their qualifications in the selected areas.

The courses are as follows:

- General English,
- Legal English,
- Banking English,
- Internet Technology,
- Science and Technology,
- Occupational Safety.

The table below describes subjects and language input and skills that are practiced in the courses.

Course	Subject	Description	Language input	Language skills
General English	Sequence of events in a story	Various situations from the everyday life	Narrative tenses	Reading, writing, speaking
Legal English	Types of company and deeds of association	<ul style="list-style-type: none"> • Types of Partnerships • Deed of Association 	First conditional, time clauses, modals, specialised vocabulary	Reading, writing, speaking, listening
Banking English	Types of European and national banks and their services	<ul style="list-style-type: none"> • Key terms in banking • Functions & services of a central bank • Role and services of a commercial bank • Differences between a merchant bank and a commercial bank • E-banking • Various methods of payment • Opening a bank account • Applying for a loan • Writing a letter of complaint 	Passive voice, Perfect tenses, polite requests, specialised vocabulary	Reading, writing, speaking, listening
Internet Technology	Internet and Intranet services	<ul style="list-style-type: none"> • Client-server architecture • Standard Internet services • Advanced Internet services • Internet servers and browsers • Web browsers • Html and additions • Authoring tools for the www • Creating and managing resources • Techniques and tools of the intranet • Intranet and collaborative software • Security issues 	General grammar, specialised vocabulary	Reading, writing, speaking, listening

Science and Technology	Elements of telecommunications: signal processing	<ul style="list-style-type: none"> • Overview of Signal Processing • Digital Signals • Mathematical Tools for Signal Analysis • Digital Filters • Adaptive Digital Filters • Application of the Adaptive Filters 	specialised vocabulary	Reading, writing, listening
Occupational Safety	Chemical hazards	<ul style="list-style-type: none"> • Chemical threats in industry • Life saving in industrial sites • Chemical equipment used to assess the danger in case of chemical disasters • Transportation of dangerous materials • Loading, unloading, manipulating the load • Properties of dangerous materials • Chemical breakdowns • Chemical compound groups and their basic features • Legal aspects of fire protection 	Relative clauses, inversion, specialised vocabulary	Reading, writing, speaking, listening

The courses are designed for university students. They will be used in the first phase as an addition to traditional courses and in the long term included in the curriculum. The requirements for the students to participate in the courses are the following:

- they have to have an intermediate knowledge of general English,
- basic knowledge of the subject domain specific for each course,
- basic computer skills: use of the Internet browser.

They may be used also by professionals who already have knowledge of the certain subject areas, and need only to learn how to express the concepts in English.

The content material may be accessed either in linear (page by page) or hierarchical (using the list of chapters from the menu) manner. All the information about the structure of the material is stored by the system in database. The example of the navigation is shown below.



Picture 1. Content browser in the system

There are three levels of hierarchy:

Unit

Content material consists of defined number of units set in the sequence (similarly to contents of a book). A user can browse units sequentially, or referring to chosen ones. Units are reusable, which means that the same unit may be used many times – being a part of many learning packages.

Section

A brick is a sub-unit form. Navigation in the scope of a brick is made sequentially (move one page forward or backward), it is also possible to refer to other pages from the same section.

Page

A page is a HTML document (in broaden sense DHTML document). A page may contain any multimedia objects compliant with HTML standard (illustrations, sounds, animations, etc.)

Many learning packages may use the same unit of content material. This unit is not replicated in the system but it is stored only once and the courses are provided with proper references to it.

Each unit may contain testing questions (elements of exercises and tests).

The systems supports the following types of questions:

1. choosing one correct answer
radio button
2. choose one or many correct answers
checkboxes
3. classify the elements
drop-down list with one or many correct answer
4. complete the text choosing one correct answer
drop-down list with one correct answer
5. complete the text filling the gaps
text boxes
6. complete the text correcting given expressions
text boxes with predefined values
7. write several sentences on given topic
text area for dissertation sent to the tutor
8. match the elements dragging and dropping them
software component DHTML for drag and drop

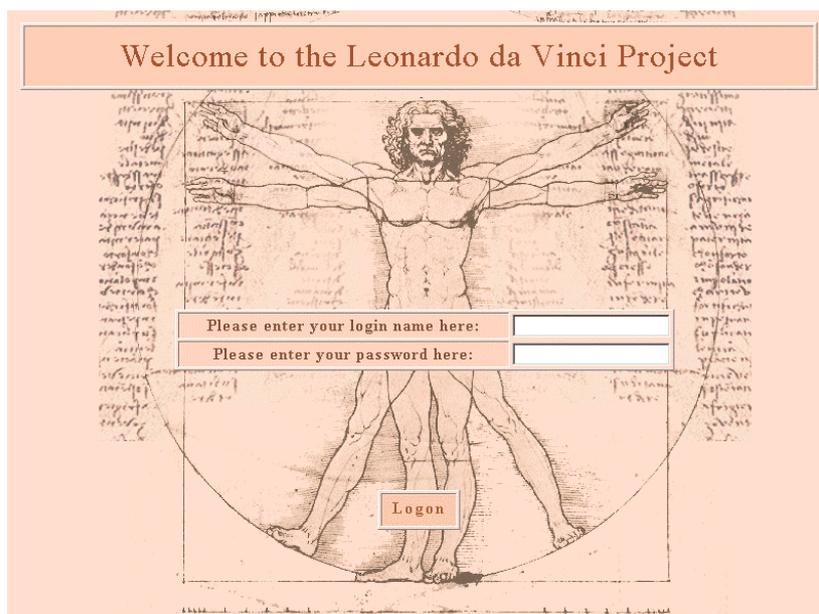
All multimedia objects accessible in HTML may be applied within the content of exercises (graphics, cartoons, photos, short animations, music, speech, video sequences, etc.)

System Description

The system works on the computer network. It can be a local area network (LAN) as well as wide area network (WAN). The type of the network determines transfer rate and to some extent the volume of content and the functionality of the system. The system is designed both to work under strict tutor control as well as with minimal interference thus:

- lectures may be taken by students without any activity of the tutor,
- exercises may be done individually or may require a tutor,
- consultations are held with full interaction with the tutor.

Access to the system is provided using password authorisation. The user is assigned to a certain course (learning package) or to many courses.



Picture 2. Login screen to the system

Roles of the system users:

System Core Administrator (SCadmin) – a person having thorough knowledge on the system and its environment incl. operating system of the server machine, database management system, internet server and other software and hardware components being system components or supporting its functions; does not have to have any content material related knowledge;

Content Material Administrator (CAdmin) – a person managing the content material stored in the system, modifying the database content using only functions provided to Content Material Manager (CMM); does not have to have thorough knowledge related to technical aspect of system;

Training Administrator (Tadmin) – a person managing the training processes, adding students to the groups, assigning courses to the students, organising the schedule of the training; does not have to have thorough knowledge related to technical aspect of the system;

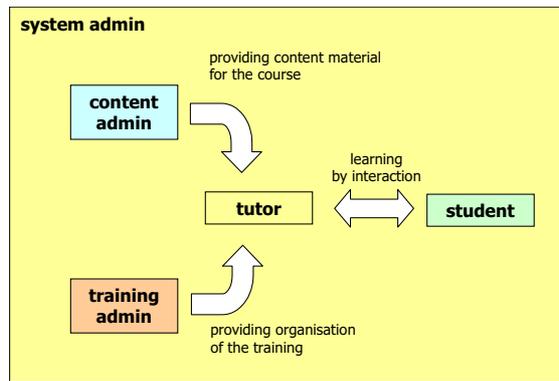
Student (student) – a person having the basic knowledge on client computer operating system, web browser used by the system, and all the software components used in the system especially the navigation mechanisms;

Tutor (tutor) – a person having the basic knowledge of client computer operating system, web browser used by the system and thorough knowledge of domains connected with the whole or a part of content materials in the system.

Guest (guest) – a person with unknown level of familiarity with the system, having access to chosen demo parts of the system; the role is mainly conceived for marketing issues and for visitors

One user may be assigned to more than one role.

Mutual relation among the roles is shown on the picture:



Picture 3. Relationship among users

System supports two main learning activities:

- acquiring of knowledge – material presentation called also lectures,
- testing the knowledge – exercises, consultations, tests, and examinations.

Additionally the system maintains administrative functions.

Functions of the core can be divided into three categories:

- providing lectures for students without activity of the tutor,
- providing exercising for students with limited activity of the tutor,
- examining the knowledge acquired during lectures in the form of knowledge tests,
- providing system reports and administrative information,
- providing additional information according to the access rights.

Functions used by given roles.

Students' functions supported by the system:

- participation in lectures,
- participation in exercises,

Tutor's functions supported by the system (usually limited to certain learning package):

- registering students in the system
- controlling students' access to system facilities
- generating the knowledge test result reports (KTRRs)
- generating the progress assessment reports (PARs)
- controlling discussions,
- direct the consultations,
- checking the answers to the exercises demanding tutors interference.

System Core Administrator's functions supported by the system:

- controlling the access of tutors and content material administrator,
- reporting on system usage and other statistics,
- maintaining the server,

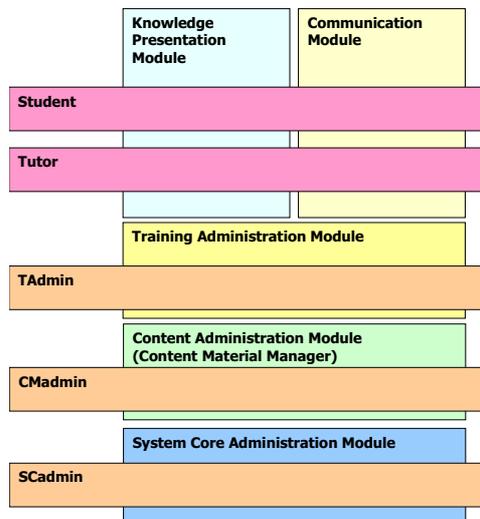
- providing technical help for the remaining types of users.

Content Material Administrator's functions supported by the system:

- installing and deinstalling of the learning packages in the system using Content Material Manager (CMM),
- modifying certain parameters of the learning packages,
- generating reports on the content materials in the system,
- controlling the versions of packages and bricks.

System consists of the following software modules:

- **Knowledge Presentation Module; KPM:** serves for presentation of content materials in on-line and off-line form;
- **Communication Module; CM:** supports communication and collaboration among students and tutors;
- **Training Administration Module; TAM:** supports administration of students' data, groups of students, and scheduling of the course;
- **Content Material Administration Module; CMAM:** supports administration of content material packages in the system;
- **System Administration Module; SAM:** for managing access issues and controlling vital functions of the system.



Picture 4. Functional framework of the system

Summary

The product of the project consists of the network system and six thematic English language courses. The system supports many different kinds of activities, which may be compared with conventional lectures (selfstudy), exercises, or consultations. The content material developed in the project will help technical university students acquire a practical knowledge of English language. The system with the courseware will be the subject of commercialisation after the project has ended.

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