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Dr. Erwin Wagner and Dr. András Szűcs
on behalf of the European Distance Education Network

European Distance Education Network

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Introduction

EDEN has initiated in 1998, as part of the strategy of the Association for the support of professional development in open and distance learning, the strand of research activities. Following the memorable succes of the first Research Workshop in 2000 in Prague, it was decided to announce the Second Research Workshop to deal with the relation of research and comprehensive aspects of Open and Distance Learning and eLearning, focusing policy and strategy issues.

The concept of EDEN with the organisation of the Hildesheim Research Workshop was to strengthen the position of ODL and its competent actors, define relevance and potential contribution of research in ODL for political decision-making, improve suitable platforms for discussion with regional and national governments, funding organisations and the European Commission, and support decision-making and consulting. This was intended to achieve by the contributions of our regular partners: the professional groups of representatives of ODL and lifelong learning academic community, research and educational policy professionals, project groups and consortia working with development,monitoring, observation issues, research institutions, networks and professional organisations.

What kind of research experience in ODL can be considered as really new knowledge? The basic added values of research are traditionally analysis and explanation of the facts and information from the field, new synthesys of elements of knowledge, academic evaluation of experience, development of prospective models and scenarios for the future. It is in the meantime increasingly true that with the widespread of use of information and communication technologies in education, emerging in a large number of learning situations, there are submissions at distance education conferences which represent professional approach and undoubtedly good quality but highlight mainly technical applications of ICTs and multimedia in different courses. Our approach of assessment in such cases has rather been to safeguard the special focus of the workshop, meanwhile to share those interesting pieces of information with the professional community which may serve the enrichment of experience for ODL experts.

With the Second Research Workshop, EDEN wished to approach wide circle of those with experience and objectives in strategy and policy issues: national research centres, and also: ODL practicioners producing innovation and new knowledge, departments or sections of universities, centres of excellence, institutes all around Europe which seek their way to research activities. We are delighted to present in this volume near 60 papers, selected from the more than 80 submissions received from 20 countries, all over from and even outside Europe. The contributions show a systematic and confident use of professionally justified methods and approaches in the development of institutional strategies. A rough comparison with previous EDEN conferences' experience reflects a shift in focus of submissions has from methodology and course development issues to the institutional development dimension,which can be explained with the policy orientation of the workshop. A confident and comprehensive approach is certainly charactersistic in the experience presented. The concept of essays has been well understood: it was our pleasure to publish the concise, focused, meanwhile clear and mostly even enjoyable papers received.

Dr András Szűcs
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Dr Erwin Wagner
President of EDEN
Chair of the Workshop
Scientific Board

Acknowledgement and thanks are given to the Workshop Scientific Board:

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A FRAMEWORK FOR EUROPEAN COMMISSION PROGRAMME FUNDING
ANALYSIS, RECOMMENDATIONS AND PROPOSAL FOR DISCUSSION

Prepared by the European ODL Liaison Committee

Introduction

The *e*Learning Action Plan, underlying notes and following Calls for Proposals constitute a major challenge for all member states', and prospective members', governments, education leaders at all levels and industries/organisations working in the field.

It is therefore evident that the Liaison Committee (LC) and the constituent Networks give ample attention to the policies adopted and measures, taken and projected, to implement them.

We underline that, although the Networks in the LC cover many different areas of education, *e*Learning has a message for all Networks and their members, and all feel deeply committed.

The LC has been informed about the project HECTIC (EU policies and Strategic Change for *e*Learning in Universities) and follows further steps taken in the context of that project with great interest and, in the case of some Networks, also involvement. However, there is more: HECTIC was deliberately designed in such a way that the Programme structure of the European Commission and the processes around EU projects would *not* draw attention away from higher order, more political deliberations.

Precisely the Networks in the LC, on the other hand, are constantly under pressure of their members to give (more) attention to a careful, constructive but also honest appraisal of the day-to-day project practice. The LC has therefore decided that it would itself take up and discuss the issue, and if possible come up with practical recommendations. It wishes to establish an open dialogue with involved officers of the European Commission and try and find ways together to move forward to further improvement of the EC funding system.

This note has been written to enable a concrete discussion and focuses on a set of proposals for direct implementation.

We limit ourselves to education in its full width, as covered by the Networks in the LC, but take into consideration the full array of stimulation and research programmes of the European Commission.[1] Statements which are thought to be rather evident are not always fully argued for sake of brevity.

Discussion

The Liaison Committee focuses this discussion on its impression that the European Commission has to use the Progamme Funding instrument also for the implementation of approved major political objectives and priorities. This means that the discussion will address only a certain part of the whole of Programme Funding, viz. the parts designed to realize these major political objectives, like at present *e*Learning in the context of *e*Europe. As will be argued below the LC thinks that for such processes the instrument is not adequate, but can be modified within their constraints to satisfy the needs of the Commission.

In other words, this means that the LC does not propose to discuss the whole of EC Programme Funding for Innovation in Education but only a rather restricted, identifiable part of it. However, part of the observations made below may well apply to the whole of Programme practice and the LC thinks

[1] Several members remarked in earlier discussions that they know that similar uncertainties and frictions exist in totally unrelated areas of European Programme funding.

that the European Commission would lose an opportunity if it would not take these into account in its usual monitoring and evaluation of Programmes.

The LC has organised the discussion of the Programme Funding instrument for major political objectives into three parts: an analysis giving the arguments for its intervention, general recommendations and a proposal in which it illustrates how improvement could be achieved.

Analysis

For the sake of discussion we distinguish in this note the following three aspects which in reality are strongly interrelated:

- Political Objectives of Programmes
- Programme Structure
- Handling of Programmes in Practice

Political Objectives of Programmes

The members of the European Communities/Union have received complementary stimulation by the European Commission for education/formation/training over more than 15 years and much longer for research/technological development. Programmes were defined to enable the Commission to distribute the money made available for the simulation of e/f/t and r/td.

The stimulation of innovation and cross-border cooperation are the constant objectives of all Programmes. Further objectives that define the different Programmes have become more elaborate over the years when the European Commission launched major operations, increasingly involving the sectors of education and research, and came with sets of more detailed goals and objectives that found their ways in the different Programme Work Plans. This increase runs parallel with the gradually enlarged responsibilities of the European Commission.[2]

There is increasing friction between the way European Programmes are structured and organised, essentially as a result of progressive incremental adaptation over many years rather than fundamental (re)thinking, and the complex and targeted political objectives which at least part of these Programmes are gradually intended to serve.

We have the impression that also in EC circles doubts exist which are related to these observations when reference is made (with regret) to the scarcity of project proposals addressing organisational issues (model development, implementation, change management, etc.). But why would serious proposers join in bids if they seriously risk that even successfully executed projects end up in one-off outputs?

Conclusion

The Liaison Committee agrees with the European Commission that the European Union has to play a stimulating and dynamic role in sectors of activity where Europe-wide effects and interests are at stake. It comes, however, to the conclusion that it will be necessary to redesign fundamentally the mechanisms used to implement such general and overarching policy objectives if it wishes to be effective and sustainable in this complex and huge task.

Programme Structure

The Liaison Committee thinks that selective project funding has been, is, and will be a valuable tool for the support of creative bottom-up initiatives of different sizes, both small, medium, and large ones. A wealth of innovative or just practical, easy to handle and cheap new developments and applications have become available. But the problem is that conditions are unfavourable for these innovations to come - in genetic terms - to expression in the mainstream of education. They are not sustainable, not

[2] And, on the other hand, increased wariness of the member states that their money spent at European level should be well-spent and serve verifiable goals.

because they are bad, but because they do not meet an appropriately conditioned environment, institutionally, nationally or internationally. The creation of such environments is not a bottom-up but a top-down process and calls for overall leadership and institutional enabling leadership to become effective. This side has insufficiently evolved during the evolution of the Programme structure with stronger emphasis on serving major political goals. Especially needed would be a more committed, intensive and continuous interaction between the different political and operational levels involved.

A positive observation is the (relatively recent and hopefully growing) emphasis that is put on sustainability (Ten Telecom, eLearning). This implies that funding should only be granted to cooperation with at least a serious degree of capability and probability to survive the project term. Such statement may not be interpreted as a plea to only fund existing consortia or networks: newcomers (e.g. from new member states, but also from social organisations and institutions that are new in the field of cross-border collaboration) should get the opportunity of becoming involved as well; but even then the perspective of sustainability must remain an objective and criterion for selection[3].
Another related problem that had negative effects in the past is that the Programme structure did not give partnerships sufficient time to include the sustainability phase in their project term, while the Programme rules and definitions did not open perspective of a continuation. Also, political pressures are said to call for giving chances to other groups of applicants. By this shifting of funds from successful projects to others before the results had been consolidated the EC contributed to the loss of credibility of the Programme structure.

Although innovation has been a constant objective from almost the start of EC Programme funding, it remains largely unclear what the arguments are for innovation as an objective (economic development of the EU / support for R&D of its industry / support for the creation and maintenance of the consumer market / competition with US / dissemination of good practice / etc.), what type of innovation is aimed at (only / primarily technological innovation / pedagogical innovation / social innovation / cultural innovation), and which kind of innovation bears priority (if we have to rely on the level of funding, then clearly the technological one !). The impression exists that over the years and the various Programmes different interpretations are/have been used (e.g. pedagogical innovation seems to get a different interpretation in 5th Framework Programmes, in Social Fund Programmes and in education and training ones). It is not only confusing for the project applicants, but also for those who have to evaluate project proposals and review projects and their outcomes.

The LC also noted that serious doubts exist whether similarity of Programme structures and regulations, for instance between R&D-oriented and innovation-oriented Programmes is beneficial for the results. Should public (EU-) funding of research and development and funding of innovation in education be allocated according to the same mechanisms and procedures? There have been many pressures for simplification but we do not think that the right choices have always been made.
Also, at least some attempts in the past to cover several Programme structures in Joint Calls for subjects exceeding the thematic limits of one Programme have worked out rather disastrously for many contractants.
Finally, the LC noted that there is no global evaluation of the Programme structure, neither systematic as part of the Programmes themselves, nor incidental at crucial moments.

Conclusions

1. *The present Programme structure is not capable of ensuring the uptake of interesting bottom-up project results and otherwise obtained innovations in the mainstream of European educational practice. The structure itself should not be blamed for that but the cause is that insufficient attention has been given to the fact that implementation of major political objectives needs other, more top-down oriented process developments for which adequate stimuli do not exist now, neither at the national nor at the European level.*
2. *Within the present Programme structure so many complicating factors have been introduced that careful evaluation and revision, after redefinition of the objectives, seems to be inescapable.*

Handling of Programmes in Practice

The burocratic approach of Programme regulations and of the EC administration make work at times very hard: the increasing administrative overload, connected to regulations that must prevent a misuse

[3] One should be aware, however, that in complex projects sustainability, like the forecast of a positive outcome in high-risk fundamental research, cannot be predicted and insisting on it may kill the most interesting ideas.

of EC financial resources; the moment on which projects can start effectively (conflicting with the timing of academic year / school year); the necessity to connect national projects in an international cooperation (Adapt / Social Funds) with different national starting and ending dates for collaborating national projects; etc.
The grown practice of contracting Technical Administration Offices for the running of Programmes has a negative effect on a fluid feed-back of experiences of users to those who conceive the Programmes, i.e., the Commission officers.

Conclusion

The revision of the Programme structure should lead to revision of the way of handling projects, from call for proposals to final acceptance of the financial justification.

General Recommendations

The Liaison Committee thinks that the wealth of results of dedicated work at all levels, from the individual teacher engaging in a project to the European Commission officer who designs and evaluates the projects, justifies its intention to contribute to improving the overall effectiveness and uptake of these results in the mainstream of the educational activities for which the Networks in the LC stand : the whole of European education.

As stated in the Introduction it seeks cooperation with the officers of the European Commission to achieve this. It proposes to discuss not only the matter itself but also the actions that need to be taken (contacts with political persons/bodies, both European and national, that have to play a role in the adoption of a revised structure, publicity, discussion with members of the Networks, etc. in a coordinated way that generates powerful synergy).

Elements of the subject matter would be, following our conclusions above:

1. Agreement on the need of new instruments for research and implementation of major policies in education, including other, closer and more interactive relations with Networks/organisations of stakeholders.
2. Definition of the objectives and main characteristics of these new instruments.
3. "Cleaning" of the present Programme structure of elements that were mainly introduced to let the Programmes play a role in policy implementation; if this would not appear to be effective, reconsideration of the funded programme approach.
4. Parallel to this cleansing: streamlining of the Programme rules, regulations and practices.
5. The result aimed at should be no less than to have in place the best mechanisms to implement any agreed policies.
6. All this avoiding becoming trapped in the Programme structure under scrutiny when certain works have to be carried out.

The LC is aware of the fact that a discussion of the general problem as outlined so far is not very effective and that it may be difficult for officers of the European Commission to engage themselves in such an exercise except on a strictly personal basis. Moreover the LC is convinced that concrete action and thus results of a discussion are needed and it therefore proposes to focus on one specific area within the whole domain of education, i.e., *e*Learning. This option has the advantage that it addresses exactly the domain for which the LC has been created and that it concerns the matter for which major policy development is under way. Moreover, it could serve as a test bed for ideas and processes developed and may be followed in the future - when windows of opportunity are coming up - in other domains as well.

Proposal

We venture to state as our point of departure that the European focus should be on content rather than on funding mechanisms and project management. Moreover, essential changes are not only effected by EU funding programmes (for example in H.E. the process to implement the Bologna Declaration).

Basic issues should be identified and funding should be linked to core business. It should be attempted to use the principle of subsidiarity as an asset instead of a limitation at the European level.

The proposal of the LC therefore consists of three parts:

1. Conceptual strategic ideas
2. Relation European Commission ← → education world
3. Instruments, incl. mechanisms and sources for funding

Ad 1. In the analysis section we have argued that the present organisation of programmes leading to sequences of pilots is inadequate to achieve major educational policy goals since this practice does insufficiently lead to sustainable results which from within and bottom up effectuate institutional innovation and change. We have also argued that this lack of connectivity originates from the lack of stimulating/enabling conditions in institutions operating in the field of education. The character of these conditions may vary according to the sector and kind of education and should be further analysed. For instance, in the case of Higher Education the HECTIC project has made it clear that institutional leaders (rectors, etc.)are insufficiently equipped to carry through a fundamental process of strategic definition of the market niche that fits the institution best *and* implement the changes leading to taking that market position.

We claim that the networks represented in the LC are competent to analyse this aspect in the different sectors/kinds of education and the networks commit themselves to doing this within the time limits set in the further discussions with the Commission.

This definition process will lead to sectoral goals, like in the case of Higher Education the creation of enabling environments in individual institutions.

With these goals in the picture, long term action lines with systems of related projects to achieve them can be designed in committed but open cooperation.

Ad 2. In the preceding section we have made it clear that input will be needed, and given if we agree to cooperate, from outside the European Commission to define the goals for achieving sustainable results in institutions for education and training. Along the same line of reasoning it will be clear that a similar input will also be essential in the next phases, programme design (definition and setting of priorities), and implementation (mechanisms, rules, monitoring of progress).

Umbrella organisations can provide this input. They have the overview, can inform or consult and get feed back from their members, can make manpower available in such a way that the interests of the organisations and their members as proposers of projects in ongoing programmes are not harmed (agreement on code of practice/conduct needed), and they can monitor progress, select in their opinions best things done and care for continuity. They can assist in the creation of mutual synergy between innovation driven activities and research. Finally, they can also draw on other communication lines of their members with national authorities than can the Commission. When compared with the prevailing actual situation this means an essential position between the Commission and its relevant DG's and offices and the target groups and a content-fed enrichment of the tasks now done by the TAO's.

The networks in the LC are umbrella organisations and declare themselves willing to engage themselves in agreed operational activities.

Ad 3. When discussing possible instruments the LC concluded that improvement is not "simply" a matter of larger projects. The Commission should be able to rely on a larger diversity of means to encourage and enable creation of ideas and incentive work. The approach should be changed; there is a need for diversification of tools supporting development, and – not less – of the way how to use them.

In the preceding sections instruments have already been mentioned or implied: adoption of the principle of cooperation between the European Commission and the networks to implement objectives and goals in a committed way; investigation of the reasons of the lack of connectivity that hinders institutional take up of bottom up project outcomes; definition of goals that will result in relevant

implementation of European Policy Objectives; long term action lines consisting of skilfully combined project activities; objective driven proposals (not money driven proposals); input by the networks and participation of persons from the target sectors of education in relevant parts of the management of agreed EC actions; a process design and time schedule that satisfies the needs of the EC (and national authorities) to show robust progress at the same time coordinated with other ongoing national and European political actions and reforms, so that synergy results, down to the level of institutional leaders; a process which challenges rather than commands.

In order to realise all this we shall also have to look for appropriate financial instruments which can be applied in selected cases to show that it will pay off for individual institutions (either individually or in consortia) to do more than the average. This could also mean that systems of multiple funding are developed in this domain and that funding of agreed activities may come from a combination of them or from a single source. In this motivating way the EC principle of cofinancing may be bypassed in appropriate cases. We do not exclude a role for the Commission, or nearby the Commission, of venture capital broker (private sources or EIB, etc) to bring more freedom into the process of educational innovation and reform.

Concluding remarks

The Liaison Committee hopes to have paved the way for a fruitful discussion with the European Commission about a subject which may seem sensitive but can be handled, the LC thinks, in a way that serves and thus satisfies all parties.

In order to achieve this we also aim in our initiating talks to make procedural arrangements that guarantee substantial progress within existing constraints as far as they are inevitable.

The European ODL Liaison Committee, www.odl-liaison.org is a permanent forum for co-operation of the main open and distance learning associations and networks in Europe, established in 1999, with the aims:

- to create a forum for the exchange of views in the field of open and distance learning,
- to improve communication between the networks.
- to express common opinions and goals of the European ODL organisations
- to facilitate the engineering of Europe-wide projects
- to promote partnerships in this field in conjunction with other European initiatives,
- to give recommendations to the European Commission and Member States and
- to assist in defining and implementing action plans and programmes in order to enhance the integration of ICT in learning.

Members of the Liaison Committee are:

- European Association for Distance Learning (EADL)
- Coimbra Group
- EuroPACE
- European Association of Distance Teaching Universities (EADTU)
- European Distance Education Network (EDEN)
- European Federation for Open and Distance Learning (E.F.ODL)
- European Universities Continuing Education Network (EUCEN)
- International Council for Open and Distance Education – Europe (ICDE-Europe)
- Network of Academics and Professionals (NAP)
- European Federation for the Education of the Children of the Occupational Travellers (EFECOT)

Observers

- Association of European Universities (CRE)
- Santander Group – European Universities Network
- E.A.T.A. - European Association for Telematic Applications

AN ACTION RESEARCH MODEL FOR PERSISTENT IMPROVEMENT OF CONTINUOUS PROFESSIONAL DISTANCE EDUCATION (CPDE) PROGRAMMES

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Introduction and Background

The purpose of this paper is to present an educational management model, to support action research into issues relating to the management of distance learning programmes. The specific area addressed here is that of the management of Continuing Professional Distance Education (CPDE) programmes. Two different components are distinguishable in the term CPDE: CPD as Continuous Professional Development and DE as Distance Education. Both fields of educational studies have been extensively and separately studied and researched. Nevertheless, the emergence of new Educational Technologies (EdT) and professional development needs, due to the pressures of the Information Society, have created the need for the merger of these previously separated modes of teaching and learning. This has revealed a number of new issues involving new learning approaches, course delivery and more importantly programme management. This research focuses on and seeks to study these latter problems.

What is CPDE e-learning?

The British Computer Society (BCS) presents a definition of CPD proposed by the Engineering Council (1994) as follows: "The systematic maintenance, improvement and broadening of knowledge and skill and the development of personal qualities necessary for the execution of professional and technical duties throughout the individual's working life". According to Moore & Kearsley's (1996), cited by Passerini & Granger (2000:2), DE could be defined as: "[…] planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as organisational and administrative arrangements".

However, DE is slowly incorporating emerging modes of delivery. Sometimes even, the term is interchangeably used with terms such as: *Open Learning, Networked Learning, Virtual Learning* and the very recent *e-Learning*. These terms are frequently used to describe DE associated to a particular delivery environment for courses that are not wholly delivered using traditional face-to-face, on-campus lectures within HE (Higher Education). The main characteristic linking all these terms is the use of new Information and Communication Technologies (ICT) as a delivery vehicle. These new EdTs are the result of the convergence of computing and telecommunications, and the resulting development of ICTs such as e-mail, video conferencing and bulletin board systems. This has provided new opportunities for sharing information and interaction between individuals and groups. Benefits of ICT course delivery for the learner and the tutor and the institutions, have been discussed by a number of authors such as Stamatis et al. (1999), Nunes & Fowell, (1996), Eisenstadt (1998), and could be summarised as follows: electronic distribution of course material; flexibility for students - when to study, at what pace - supporting different learning styles; accommodation of different ability levels; establishment of communication between students and tutors, and between students; greater access to information; greater flexibility in maintaining and up-dating course documentation.

For the remainder of this paper the term *e-Learning* will be used to summarise the characteristics of these overlapping delivery methods and will be used as an umbrella term for all EdT and Internet based learning.

Challenges posed by CPDE e-Learning

There is a rich and extensive body of research addressing issues related to e-Learning. However most of this research addresses issues of learning and teaching, i.e. learning experience, pedagogic approaches, tutoring strategies, design of online environments, etc. Nevertheless, for CPDE courses to be successful, it is not enough that the courses are well designed, the modules adopt appropriate pedagogic approaches and that tutors are well versed in their subject matter areas and are able to facilitate the courses online. In fact it is also imperative to pay attention to surrounding issues such as institutional and organisational strategy, management processes, and programme structure. Managing these new online programmes poses a new set of challenges and problems that need to be carefully considered and researched.

There is considerable experience in managing these programmes that is based on practice, but is scattered throughout the higher education system, both in the UK and Europe. In truth, the increasing success of this type of distance education is based on successful management strategies and criteria emerging from this practical experience and has been the basis for the rapid expansion of CPDE programmes. Yet, because academics involved in setting up CPDE programmes have tended to concentrate on teaching and learning issues, rather than on management issues, there is very little integrative research incorporating this element of CPDE e-Learning. Therefore, there is the need to review, analyse and classify cases showing best practice in this area. The body of knowledge emerging from such distillation should then be established as good practice and disseminated through academic and practitioner channels to inform management practice. This paper aims at presenting one such successful case, identifying a CPDE management model. This model conjugated with action research, enabled persistent improvement of a CPDE course and is behind the success of this research team.

Action Research

The educational model proposed is grounded on a practitioner action research approach as the guide for everyday work and professional life (Stringer, 1999:43). It is therefore assumed that the model will evolve and change according to the fluid needs, requirements and learning approaches of CPDE students. Therefore action research is highly appropriate to the development of e-Learning, where experience suggests that significant modifications to the traditional paradigm of the supply of higher education are required (HEFCE, 2000). These required changes imply not only alterations in course models, but also development of new attitudes, in order to accommodate the new challenges posed by e-Learning in general and CPDE in particular. Cohen and Manion (1994) proposed that the most suitable approach for educational research in general, and educational informatics in particular, is to use a 'methodological pluralism'. Given that the emphasis of this particular research is to concentrate on educational models and e-learning issues, it was felt that a positivist approach would have been inappropriate. Action research is a pluralist research approach that is based on the assumption that the mere recording of events and formulation of explanations by an uninvolved researcher is inadequate in and of itself.

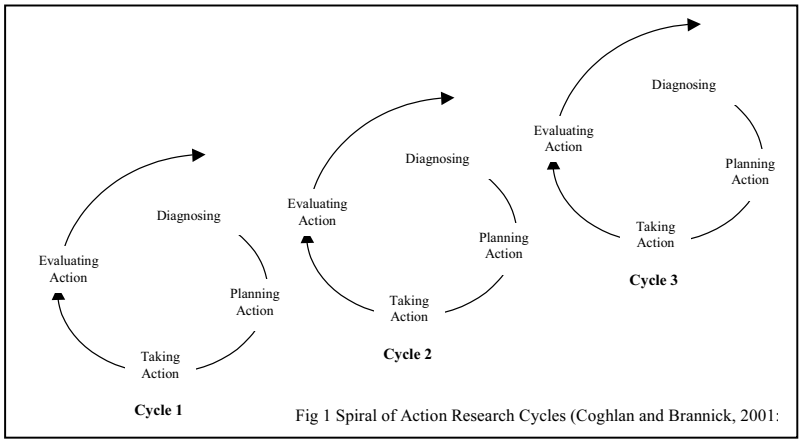

Fig 1 Spiral of Action Research Cycles (Coghlan and Brannick, 2001:

Furthermore, Stringer (1999:7) proposes that those who have previously been designated as "*subjects*" should actually participate directly in research processes and that those processes should be applied in ways that benefit all participants directly. Therefore action research is more than the traditional interpretative research in the sense that the researcher is directly involved in the research setting and in the experience itself. More specifically, the model proposed by this study draws on the framework suggested by Coghlan and Brannick (2001:11). Action research results from spiral research cycles,

starting with a process of identifying a problem area – a *pre-step* often based on the previous experience in the field of the researcher. The actual cycle comprises *Diagnosis* (data gathering, analysis and representation), *Action Planning*, *Action Taking*, and *Action Evaluation* as shown in Fig. 1.

An Educational Management Action Research (EMAR) Model for CPDE Courses

The Educational Management Action Research (EMAR) model proposed in Fig. 2 is intended to follow this spiral approach to enable course improvement, tutor development, management strategies maturation and infrastructure evolution. The model draws on an initial framework proposed and discussed by Goodyear (1999) and Khakhar (2000). This initial framework was extremely useful as first attempt to build a general CPDE management framework. However, as Goodyear (1999) acknowledges, it is only a starting point for discussion and is in danger of oversimplifying complex relationships and processes. Furthermore, it does not accommodate evaluation and persistent improvement as required by CDPE programmes.

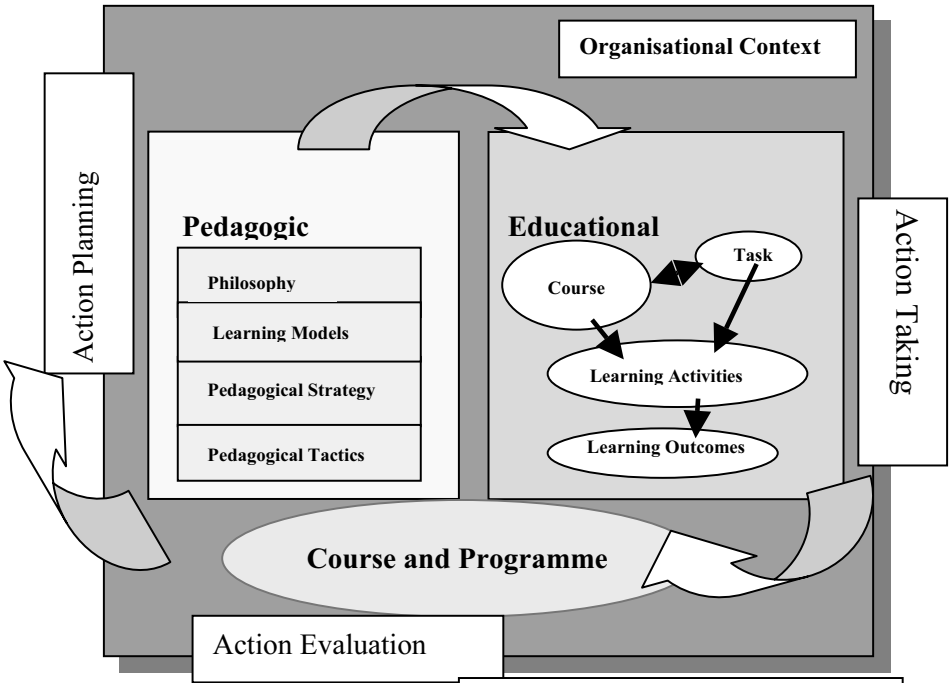

Fig. 2 - The EMAR Model

The pedagogical model adopted for CPDE is usually proposed by the curriculum designer and the course team. As discussed above, there are a number of such models suggested in the literature. Different models would impact on the design of the educational setting, that is, the corresponding tutoring strategies, learning tasks and activities, learning outcomes, support mechanisms and ICT technologies to be used.

In fact, the educational setting depends on the curriculum design for particular courses within the organisational context and following a particular pedagogical model. Curriculum design is a process by which the course aims and objectives, content, delivery mode and assessment procedures of a course are decided, taking into consideration different factors that affect the whole programme, such as (Nunes et. al, 2000): the student and his/her knowledge about the subject; the specific nature of the subject matter; the subject matter expert and the way she/he does things; the method and media of delivery. This process of curriculum design determines the syllabus, the content materials, the learning tasks, the resulting learning activities and the ICT learning environment. The conjunction of these five factors forms the educational setting.

The fundamental contention of the action researcher is that complex social processes can be best studied by introducing changes into practice and observing the effects of these changes (Baskerville,

1999). Therefore, the most important part of any educational action research model is evaluation. According to Thorpe (1990:5), evaluation is the collection, analysis and interpretation of information about any aspect of a programme of education and training, as part of a recognised process of judging its effectiveness, its efficiency and any other outcomes it may have. Assessment is an integral part of the programme and although part of evaluation, should not be considered as evaluation *per se* (McPherson and Nunes, 2001), could further elaborated as a process with the following characteristics: inclusiveness – all activities related to the learning process should be monitored and analysed; component activities – usually evaluation is composed of three components, data collection, analysis and interpretation; planned activities capable of providing useful feedback and remedial action into the programme whenever needed; both intended and unintended effects – scope of evaluation should not be limited to overt objectives of a programme, but should include any unintended effects and occurrences.

Conclusions

This research paper results from ongoing work undertaken at Department of Information Studies of the University of Sheffield into Curriculum and Instructional Design for CPDE. The model emerged from a seven year process of action research and ongoing formative evaluation of an MA in Information Technology Management (MA ITM) CPDE programme.

It is important to reflect whether this model can be applicable to other CPDE courses, as a generalisation from one single case study. According to Yin (1989:21), scientific facts are rarely based on single experiments. Theory is usually based on a multiple set of experiments, which have replicated the same phenomenon under different conditions. Hence, this model can not be considered as definitive yet. Further studies are required to establish whether the EMAR model is applicable in similar educational settings. This is already been done by this research team, who have already secured funding to develop a university-wide CPDE course template based on this model.

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PREPARING EDUCATIONAL INSTITUTIONS FOR ONLINE ODL HOW THEORY MAY SUPPORT CHANGE STRATEGIES IN TRADITIONAL UNIVERSITIES

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Introduction

Universities are faced with many challenges today. One of the most important ones is preparing traditional universities for delivering high quality life long learning activities for very broad and complex target groups. To be successful in this, universities need to implement new teaching and learning methods that are adjusted to the target population, i.e. adult very busy human beings combining study activities with an already overbooked job and family life. New ways of online delivery have proven to be a very interesting innovation in order to cater for such lifelong learning activities. However, implementing new online methods and tools cannot succeed without a fundamental rethinking of many aspects of the university. Therefore introducing online ODL calls for true leadership from university presidents, deans etc. and must be termed a very important management challenge in universities today.

Despite its importance preparing for online ODL is, however, only part of the total amount of challenges facing modern universities. Globalization, increased cooperation with business and industry, raising external funds etc. are as important challenges to university management. It is therefore of utmost importance for universities to find out what are the possibilities of combining and synthesizing all these challenges into a coherent and continuous development of the university. Working with strategies has proven to be the most important tool for universities to survive in a world of many challenges.

Having termed online ODL an important strategic challenge to university management, universities are faced with at least four tasks:

- Formulation of an online ODL strategy
- Coordination and integration of this strategy with the overall strategy of the university
- Transformation of the online ODL strategy to action plans
- Formation of the appropriate implementation organization in the university

Formulating and implementing strategies in universities must be based on university culture as such and on the specific culture and context of the university given (Stoll & Fink 1996). One common characteristic of all universities is that strategies and implementation plans are not accepted easily but that their rate of success rises if they speak a language understood and accepted by university staff. Since theory is fundamental to all university endeavours and an accepted tool for convincing people, one might argue that university strategies will raise their propability of succeeding if they are underpinned by relevant theories. It is the intention of this essay to discuss how two important theoretical complexes in modern science can be used to underpin online ODL strategy formulation and implementation in traditional universities.

New learning theories and ODL

Online ODL is today being set up in traditional universities to offer good teaching and learning activities to primarily adults working full time beside their study activities. Therefore key concepts in modern ODL are quality learning, flexibility and an ability to combine and integrate job experience and study processes.

Consequently modern ODL strategies must be able to answer the following questions properly:

- What is meant by quality learning today?
- In what way do the concepts of flexibility and theory-job-interdependence relate to modern learning theories?

- What goals and actions must be foreseen in ODL strategies and implementation plans to transform ODL ideas - based on learning theory – into new ways of successful online delivery of ODL?

Within learning theories a paradigm shift has taken place. The constructivist paradigm is nowadays very clearly the reigning one. It clearly corresponds with the overall development in society, and it is thought to develop those competences in learners that are needed to succeed today and in times to come. The crucial factor for good learning in the constructivist paradigm is that learning must be based on learner initiative and learner responsibility for learning processes. Learners therefore must be active, and learning must be interactive, learners interacting with materials, other learners and teachers. As a consequence of this also communication must be stated to be vital for successful learning processes. A good mix of individual interactive learning and collaborative learning highly based on communication can be said to define quality constructivist learning (Brown 2000).

Constructivist learning means each learner constructing his own new knowledge on top of what is already known by that person. To succeed in having individuals creating their own knowledge learning contexts must offer and support customization, which means that they must allow learners to learn differently, using different materials, different learning paths, different kinds of support from teachers etc. This claim for customization and a wide range of different materials and modes of presentation and support based on the ideas of modern constructivist learning theories corresponds highly with the need for flexibility in modern ODL. So in this respect it is appropriate to use learning theories to underpin relevant ODL strategies.

In modern learning theories the topic of different learning spaces and modes of learning is being analyzed and discussed on a continuous basis, since the traditional class room based learning processes do not correspond very well with the ideas of learner initiative and responsibility in the constructivist learning paradigm. According to theory the two most promising new learning contexts to replace the traditional class room setting seem to be virtual learning spaces and situated learning in learning communities where learning and work are combined and intertwined (Lave & Wenger 1991). Therefore theory-job-interdependence, which is vital for actual ODL today, can be said to be highly linked to very important parts of modern learning theories. So also in this respect modern learning theories can be used very easily to underpin relevant ODL strategies.

To sum up crucial goals in ODL strategies today must be to strive for creating interactive, communicative, customized, flexible learning communities for adult students based on constructivist learning theories. Both modern learning theories and experience acknowledge that such educational beliefs in an ODL context highly motivate the introduction of computers. Therefore modern ODL strategies must go for online ODL.

Implementing a constructivist online ODL strategy with success demands both new initiatives to be taken and old procedures to be transformed. Therefore the university has to undergo a process of change when implementing a new online ODL strategy. This process of change must not be underestimated because successful online delivery of ODL presupposes an organization and a culture very different from what you find in most traditional universities. It is therefore again very important to go to theory and research and look for scientific support for such university change processes in order to raise their probability of succeeding. This can be done by consulting modern organizational theories.

Change processes in universities based on organizational theories

Online constructivist ODL is so different from traditional delivery methods in universities that profound change processes have to be implemented to create a successful online university. Crucial questions are:

- What major changes are we talking about?
- In what respects can online ODL strategies use different kinds of theories when arguing for and commenting on change processes that have to take place in universities?
- How could these changes be implemented successfully?

First of all a need for some fundamental changes in universities may be derived from the overall philosophy of online constructivist ODL. Firstly university teachers must learn to accept and truly support the learning principles of constructivist learning. Secondly university culture must change from a bureaucratic organization to a service oriented customer driven organization, because only this type of organization can truly cater for customized adult learning processes. Thirdly universities must go from relying on individual staff members to an institutional approach built on teams. Only teams can create the totality of different but still coherent learning resources which should be offered in modern online ODL.

These three fundamental changes lead to a need for changes on a more daily basis in three respects:

- New ways of working must be established
- New competences must be built
- A new support organization must be established

Producing and delivering modern online ODL presupposes so many and so different competences that teams will be the proper way to organize work processes in modern online ODL. For university teachers this is a radical change. On top of this also the core role for teachers (the part where they are in actual contact with students) changes totally within the concept of constructivist online ODL. The teacher is no more the main actor or – using another image – the main player in the field. Instead he has to work behind the scene or stand on the sidelines as a stage manager or a coach.

New ways of working presuppose the existence of new competences. For university teachers for instance didactical competences become more important than before, and the ability to share knowledge and experience with others and to rely on and acknowledge what other groups of staff know and do, which is a crucial part of working in teams, also must be refined and expanded considerably among university teachers.

New flexible customized ways of designing and delivering learning in online ODL and new kinds of interactive materials all demand heavy support from experts. Therefore a crucial part of building a successful online university is to establish an appropriate support organization to secure expert help in both production, delivery and evaluation of learning resources and processes, and this support is by far not limited to technological expert help.

Having studied the nature of change processes needed to introduce constructivist online ODL in traditional universities we must now return to the questions of how theory may support such change processes and help us implement them successfully. As may be deduced from above the need for change resulting from online ODL strategies is very fundamental, cultural and organizational and has a high degree of complexity and scope. Therefore theoretical underpinnings for such change must be looked for in theories comprizing whole organizations and valuing processes rather than structures. Both these virtues characterize to a high degree modern organizational theories. First and foremost theories of the learning organization are important and very usefull in this respect (Senge 1990). In these theories the very important cultural dimension in organizations, and in this case in universities, is acknowledged, and competence development is deprived of its often much too narrow interpretation – as bringing staff to formal courses – and is instead transformed into a never ending demand for individual and common learning, which is a much more fruitful and prosperous way of looking at competence development when it comes to universities and university staff. Successful organizational learning presupposes, however, a set of conditions which must be present:

- University management must clearly support and value organizational learning processes
- A common organizational learning philosophy must be established and accepted by all
- An organizational unit must be created to support change

As indicated in Stoll & Finks (1996) model for school improvement leadership encircles all change processes in educational institutions. One might argue, however, that commitment from leaders in educational institutions is especially needed in the initiation phase, where reasons, goals and methods for change are defined, and in the institutionalization phase where the results of change are given lasting life, when built into new lasting pocedures, new ways of organizing things, new ways of

solving problems etc. The actual change processes on the other hand can more appropriately be supported on a continuous basis by a unit dedicated to this task, a socalled change agent. As stated by Buchanan & Boddy (1992), based on their study of many actual change agent units, such a change agent must be able to support and initiate interpersonal, communicative processes so very fundamental to change processes in organizations and must be able to serve as a broker between all university staff and existing university units in order to support a needs and user driven development in the university organization.

As mentioned in the introduction, strategy development in universities must recognize as a fundamental principle, however, that universities do not work properly when treated solely as top-down organizations. Therefore despite the importance of leadership it is vital in order to be successful here that a common bottom-up organizational learning philosophy be established and accepted by all. A philosophy based on networking and experimenting seems to be a promising concept to go for. Two complexes of theories may support such a philosophy. Firstly the theory of situated learning in learning communities, already mentioned above, may support the creation and support of learning networks in universities, where experience is shared – in this case of ODL it may be experience of how to support ODL learners, how to introduce new methods for securing theory-job-interdependence etc. Theories of knowledge management may also support the concept of learning networks in universities. Secondly Kolb's learning theory can be mentioned as relevant to creating new ways of online delivery in universities (Kolb 1984). In Kolbs learning circle experiments form an integral part of change – related to both change in ways of thinking/talking (through new concepts) and change in ways of acting (through new experiments). In universities we do not know exactly what we are going for in online ODL, since what we hope to create should be different from what we have got now and adjusted to a target group whom we do not know in detail. So new concepts and methods are needed, and experiments seem to be an obvious way to create such new concepts and methods as stated by Kolb.

Concluding remarks

This essay set out to discuss how theory and research can support the formulation and implementation of online ODL strategies in universities. Learning theories and organizational theories have been mentioned as the two main theoretical complexes that may help us raise the credability and persuasiveness of such strategies. Some universities worldwide have tried out successfully combining strategy and theory. It is now important to widen the scope and have many more universities use this method for strategy formulation and implementation and subsequently secure that experiences gained are shared in a context of mutual trust and support. Especially international organizations will have an important part to play here (Lorentsen 2002).

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WHO SHOULD "CUSTOMISE" THE KNOWLEDGE CONTENT ? PUBLISHING SCHOLARS OR ON LINE EDUCATORS ?

Christian Bois, Antéor and University of Toulon

Introduction

Both learners and On Line Courses Facilitators need easy to access scientific texts which make the knowledge content of a course. But too many interesting texts fail into categories like :

- texts lost in the ocean of the Internet,
- texts imbedded in expensive books or reviews,
- texts chunked into smaller sub-texts,
- etc..

We think that this issue has to be clearly represented. There is a lot to do to make a picture of all this categories, to imagine the solutions for each, to demonstrate the necessary processes to decision makers.

In the present paper, we draw a first sketch of this wide picture.

1. The context : scholarly publications as knowledge content for on line learners

1.1. The crisis of scientific publication

The scholarly publishing practices are heavily challenged by three evolutions.

First, the academic credentialing system -the evaluation of faculty members up to the quantity of publications- "encourages faculty members to publish some work that may add little to the body of knowledge" -Magner (2000)- This leads to a saturation of the publishing area. For example, "young scholars have reported increased difficulties getting their first books published" (op. cit.).

Second, the relative shortage of university libraries' budgets –increased number of publications plus high prices- have different kinds of consequences. Among them, "the "death" of the scholarly monograph in the humanities" (op. cit.).

Third the development of the movement for free availability of publications over the Internet leads to copyright problems and more.

1.2. Great expectations for On Line Education

Concerning On Line Distance Education, a radical change in the availability of documents was expected. "The world of coalface flatfile html markup would begin to disappear in favour of collaborative working, managed workflow, document versioning, on the fly pages constructed out of application independent xml chunks, site management tools and push-button publishing via multiple formats - html, xml, pdf, print, etc. Text appearing in more than one context would be stored in a central repository and repurposed according to particular requirements." Hunter (2001)

This age of "dynamic text" is yet to come. Here, we shall limit our reflection on the availability of "plain text" over the Web.

Our concern is about the Knowledge Content and the form of these texts and who should improve them.

1.3. When texts are in publicly accessible archives

We consider as "out of scope" the writings that go through journal publishers. These journals have still relatively "rigid" formats that allow little creativity from authors. On the contrary, free publication through personal pages or community pages allow for creativity.

“E-prints are seen as a catalyst for the freeing of the scholarly and scientific literature from the cost barriers imposed by journal publishers. Supporters of the self-archiving concept (as it is sometimes known) argue that the easiest, fastest and cheapest way for authors to make their papers available is to store electronic copies of these (both pre-prints and reprints) on e-print servers.” Day (2001)

“It is a simple subversive proposal that we would make to all scholars and scientists right now: if from this day forward, everyone were to make available on the Net, in publicly accessible archives on the World Wide Web, the texts of all their current papers (and whichever past ones are still sitting on their word processors' disks) then the transition to the PostGutenberg era would happen virtually overnight.” Harnad and Hemus (1998)

1.4. A new peer review practice

Of course, out of this practice of self publication , the upstream “peer review” quality control is lost.

But PostGutemberg thinkers have imagined that peer review can be reintroduced downstream through “comments by peers” that could be added to each document. Moreover, any document can be equipped by a visits counter etc. and track can be kept of the quantity of visitors and even of their appreciation which is pretty absent from classical paper reviews.

1.5. New practices and technical issues

1.5.1. Alternative practices give ideas to “groups”

For example, we could take a look to the SPARC initiative. “SPARC is a worldwide alliance of research institutions, libraries and organizations that encourages competition in the scholarly communications market. SPARC introduces new solutions to scientific journal publishing, facilitates the use of technology to expand access, and partners with publishers that bring top-quality, low-cost research to a greater audience. SPARC strives to return science to scientists.” This text may let the reader “perplex”. The beginning says “alliance of institutions… encourages”, the end says “return science to scientists”. In fact, it looks like scientists have not the maturity for managing their contents and that they need an “alliance” to do it for them.

1.5.2. The technical obstacles, if any…

On the feasibility matter, Inger gives few chances to a researcher to establish “alone” his publishing system. “If you are serious about building a server network that can deliver your content to a global audience then you have two simple choices. The first is to invest in the expertise needed to build such a service and the infrastructure capable delivering your data. The cost of performing the tasks necessary in doing this can vary quite widely depending on the market you are trying to reach, the amount of data that you need to move around the world to and from users, and the sophistication required of the access control and security features. … The second option is to subcontract the effort to one of the companies who have already gained experience in what it takes to deliver a genuinely international service.” This has to be questioned too.

2. The core issue : On Line Students “starving” for pertinent documents

A large number of practitioners and researchers underline that Online Distance Education Courses should be learner centred –Bois (1999)-. Radically, this means that only the framework of the course is established in advance. And that the content is accessed “à la carte” by learners through browsing the Web or the local university Intranet. This content should be made of “pertinent” documents.

First, the documents shouldn’t be too short. But “some professors publish research results in a handful of small articles, rather than a single large one, in order to make their record of scholarship look more prolific.” -Magner (2000)-. Second, they shouldn’t be too long. Too often, the key article is embedded in a book, “lost” in a bunch of generalities of the sub discipline.

The original ideas play the role of an “attractor” to have the book sold. The efficient way of publishing “strong” ideas – i.e. in electronic format in “mid length” paper- is avoided.

Third, texts should be “clear”, which brings us to the next question.

3. To whom does a publishing researcher write?

Attending scientific conferences shows that there are different “styles” of publications. Some tend to orient to “encryption”, some tend to develop didactic qualities. But didactic qualities is only being attentive to the matter which is transmitted. The next step is to re-write according to the audience interest. This once was called pedagogy or, for adults andragogy and better anthropogogy. But there is a wide range of potential audiences :

- The audience that will be present the day of the conference,
- The colleagues i.e. people of the same level of knowledge,
- Eventual doctoral students working on the matter,
- Master students,
- Bachelors.

The “big market” for a text is neither the colleagues, a handful of persons- nor the doctorate students, a little more than a handful. The real market is the bulk of On Line masters and even bachelors students who form a growing “crowd”. This market should be aimed by researchers :

- Either for their own interest of being “known”,
- Or for the interest of the undergraduate on line students working on personal projects-action learning, learner centred education, etc. - who need the information.

4. Customizing upstream or downstream?

4.1. Motivations and obstacles upstream

A scientist, as well as the university or institution which she/he belongs to, has interest to have most people understand the produced texts. This is one of the way to get visibility and reputation.
Writing “easy to read” texts should be an important concern. But “cryption” keeps its charm for writers “not so sure about the truth they deliver”.

4.2. When the job is done elsewhere

Who are the “customisers” of knowledge in 2002?. Shall we take the example of the word “boustrophedon” through Google search engine -boustrophedon is the name for an ancient way of writing one line from left to write as in European writing and the second from right to left with letters mirroring like in modern Semitic writing and so forth alternatively.- Boustrophedon was used for example in Greece 650BC or for original writing of the Ten Commandments or for Easter Island's Rongorongo script.

The first link with “boustrophedon” is to the site of a guy who is impassionated about the subject and has developed a software to transform an European text into a boustrophedon writing –claiming boustrophedon can be read more rapidly than single direction lines-.
Links number 3,4,13,14 are by dictionary providers. Many links in between are to jargon dictionaries providers.
We must wait for two links around document n° 60 to have academic reference to “boustrophedon”.
If we search “boustrophedon research” we get links to a maths and robotics use of the word.
Number 25 refers to “'Curse tablets' and other documents on metal from Roman Britain”.

As a second example, shall we search for a word like “globalisation”. We find mostly militant sites and documents.

A third example with the apes named “Bonobo” gives mostly links to “initiatives for saving”. A search on “Bonobo knowledge” allows to find “Popular science” site.

So, the knowledge customisers we identified are :

- dictionaries and encyclopaedias, the first customisers of knowledge available on the Internet,
- impassionated people, militants and initiatives which are supposed to miss objectivity,
- popular science sites.

“Popular” translation of scientific papers, among other transformations, tend to blur the controversial aspects. If an author says “Chapter one, it is so” then “Chapter two it may be different” the second chapter is often skipped or smoothed not to confuse the “simple” reader.
This doesn’t fit with the need of students who have to develop a sense of truth and proof. The student must have access to the certitudes and in-certitudes of the method. This is rarely fully present in popular translations.

The “basic” learner will tend to rely on what was found at first in this three categories of texts.
It takes a lot of effort to the learner to search ahead, in the ocean of texts, the scientific ones.

4.3. Motivations and obstacles downstream

If the work is not done upstream, how should it be done downstream by the On Lin Educators who need matter for the learners? It is a huge work to customize the bulk of texts corresponding to the wide range of questions a cohort of learners could ask within the framework of a course. Only very motivated course facilitators would do that.

5. The need for transnational knowledge customisation studies and actions

Henderson and Browne as well as Raitt (2000) stress on the role of learned societies and transnational projects to make as much texts as possible available in a digital form. But the labour is so vast that there are choices to do. In each discipline, there are key texts that must be identified.

Conclusion

The issue of the availability of scientific texts for On Line Learners is at the articulation of many problematic fields. First, there is the issue of the motivation for publishing :

- one about scholars who are evaluated upon the quantity of texts,
- one about the roles learned societies play and how they have subcontracted their publications to editors.

Second issue is about the correspondence between what is written and what Eco calls “the typical reader”:

- how authors have a clear view of the need of learners,
- how readers manifest their needs.

Third issue is about alternative ways for disseminating scientific texts :

- how individuals would organise in networks for mutual peer review,
- how disciplinary portals would interface learners with available texts,
- etc..

The scientific text is at the cross roads of cognitive, economical and social axes.

The study of such a matrix should be done through a Systemologic, Interdisciplinary and Complexity approach. This would allow for a clearer representation needed for coordinated actions by decision makers. This enters in the broader issue :

- what part of education direct and indirect matters should be left to the market laws?
- what part should be organized by the public bodies?

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DEVELOPING A RESPONSIVE CURRICULUM ON LAW FOR HEALTH AND SOCIAL WELFARE PROFESSIONALS

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Introduction

In this paper we outline the approach we took in developing a curriculum in law for students studying for the Diploma in Social Work. We produced two law courses for the social work market - one for Scotland and the other for England and Wales. These courses addressed the full range of legal issues that professional social workers 'need to know' and the task facing the course production teams was to craft a law curriculum for non-lawyers which succeeded in contextualising the law and taking the law seriously. These two law courses are open to professional and lay audiences. The first section of our paper describes the approach we took and analyses a number of outstanding issues.

The second part of our paper considers the lessons to be learnt from this experience in the context of a new 3rd level course for health and social welfare professionals on the legal and ethical issues that they encounter in practice as well as those raised by their practice. We conclude via a consideration of two broad issues: (1) using ODL, how best to craft a learning agenda which successfully links with a wide range of practice environments and (2) the distinct ways in which non-lawyer professionals need to have an understanding of law.

1. Developing a law curriculum

At present the School of Health and Social Welfare presents two level 2 law courses: *K269 Social care, social work and the law (England and Wales)* and *K267 Social Work and the law in Scotland*. Successful completion of one of these courses is compulsory for students, based in England and Wales or Scotland, studying on The National Open Learning Programme (NOLP) for the Diploma in Social Work (Dip.S.W.) – the key professional qualification for social workers in the UK. The Dip.S.W. has succeeded in widening participation in Open University study to those in the work place and has played a key role in the training of social work students unable to access more traditional routes of study. K269 and K267 are open access courses thereby meeting the aim of widening participation for professionals across a range of disciplines as well as for service users. The law courses are therefore bringing high quality, accessible materials to students from both a professional and lay market.

2. Non-Open and Distance Learning Lessons

Health and social welfare professionals do not need to study law in exactly the same way as lawyers - the requirements are different both in form and content. However before considering the differences between 'law students' and the students on our 'social work law courses' it is useful to remind ourselves of their common needs viz: some understanding and familiarity with key legal concepts/language e.g. powers and duties; some knowledge of the law making process; an understanding of the fluidity/discretion inherent in all human decision-making processes; the critical policy debates underpinning major legislative change; and finally the development of a critical sense about the law.

So what is distinctive about legal education for non-lawyers? First for students on K267 and K269 are more anxious about studying law than the conventional law student embarking on a law degree. The law student is immersed in the law and the law and legal knowledge is central to their studies while for the social work law student not only do they have to deal with the legal framework of their practice but the particularity of the relationship between the law and practice. The social work law student does not study law for its own sake but in order to better understand the myriad ways in which practice and interactions with service users is regulated. In other words the social work student is engaged in two systems (law and social work) and yet has to work within the at times powerful presence/context of the law.

Second, and following on from the above, the level at which the such students study law is different. The K269 and K267 student has to engage with the complexity of the law-practice interface – this is the centre of the intellectual challenge presented by these courses. In contrast the law student engages with the detail of legal procedure and doctrine in order to become a lawyer; this entails intimate familiarity with complex legal concepts and language and the development of the habit and practice of thinking like a lawyer.

3. Open and Distance Learning Lessons

1. The Open University has to provide appropriate support for tutors who have to straddle two 'worlds' - that of law and that of the practice environments that a significant percentage of the students come from – in order to support the students in their learning. Tutors also need support in their straddling of two worlds. Not only do they have to mediate/support the students' engagement with the course materials but they also have to provide constructive feedback on Tutor Marked Assignments.
2. Another question that arises is what different kinds of resources does such a study of law require? The materials needs to be activity led in order to provide students the opportunity to engage in practice dilemmas and they need to be accessible and anchored regularly by narratives linking law (in the books) and social work practice. Thus the Activities require careful feedback (or post-activity comment), the law (as in statutory provision and legal doctrine) needs to be accurately and clearly expressed (so that the activities and comment are intelligible), and located with a strong structure/narrative. The aim is to ensure that the student understands the shape and purpose of the law and its relationship to social work practice. What does **not** work is an accurate listing of relevant statutory provisions which undercut the ability of the student to acquire for him or herself a sense of how the laws works in a given the situation. (Many of the existing law for social work text books fall done on this point - their organising principles are derived from outside of the professional agendas of social work and rooted too firmly in that of the law) The starting point is 'real life' dilemmas' not the internal coherence of legal doctrine and procedure. Thus alongside the activities and narrative of the course material diagrams and flowcharts are needed to provide an overview of complex areas of law and the law practice link.

4. Lessons learnt

Much of the above discussion could be applied to any other professional group. Our experience to date has been with the needs of social work but in our planning/thinking for a proposed 3rd level course on *Professional Practice: Legal and Ethical Issues* we have become increasingly aware of how generalisable much of our experience is.

1. Whether we are talking about doctors, nurses, health visitors, youth workers or teachers the lesson is the same; the only way in which you can set up an intellectually valuable and professionally relevant study of law is if you take seriously the law, the professional concerns (policy and practice) regarding the regulatory legal framework and the interface between the two. Part of this also requires the recognition of other 'interests' beyond those of the professional e.g. policy debates, service user perspectives. For those seeking to design new courses for professional audiences - they need to be able to straddle multiple worlds, finding a language/ imagery/themes that can travel across these worlds.
2. Support for tutors is critical. Not only do we need to make the right appointments we need to provide mentoring and support so that they can become effective supporters of adult learners and to develop and produce high quality materials to secure the learning outcomes of the course
3. Further development of accessible, accurate and clear law materials (law reference pack). The law cards, which are an integral part of the resource pack used by K269 and K267, are available electronically on the web. This resource is already drawn upon by a number of other courses in the SHSW. Our plans for the future entail further development of this resource, in terms of its range and interactivity and we see this as being a resource increasingly drawn upon by the whole School. The web based law resource will have strategically important case studies and references 'out' to other texts e.g. codes of ethics, government guidance, National Service Framework documents etc. This planned development will permit students to access relevant user friendly legal resources in order to solve problems thrown up by practice. Yet again this allows a focus on applied knowledge, a consideration of the law in action and law's framing of how professionals and others make decisions as opposed to law as abstract doctrine and process.

LEARNING NATION LESSONS

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Introduction

This paper is based on observations made over the past three years on successful and unsuccessful online learning communities around the world in Europe, Japan, New Zealand and North America. The paper is not presented at a pedagogical level but focuses on the promise of ICT to transform learning and society in the 21st Century.
It also draws a number of lessons – The ten commandments to deliver the Digital Dividend. These commandments are applicable to the developed world and will enable the developing world to cross the digital divide to deliver learning that addresses culture and pedagogical issues at a local level.

Time, Distance & Resource Mastery

Communications, content and computers have transformed the educational landscape but the focus by governments on Broadband access and Multimedia Content is missing one key element that will truly empower online learning communities. The missing link that ties content to communications is collaboration. Collaboration is the key technology to deliver the digital dividend and the Learning Nation evolution.
Collaboration delivers the skills required for success in the knowledge economy.
Learning is constrained by resource limitations such as money, people, time, buildings and fear of the future where users take responsibility for their learning and the educator's role changes for "sage on the stage to seer on the side".
Time and Distance are enabling factors to alleviate resource limitations.
Open Distance Learning alleviate resource limitations by allowing access to scarce resources from a distance, so reducing the need for travel time and makes best use of scarce "expert" resources.
eLearning can be seen as the methodology to overcome resource limitation by making quality learning available at a distance. Today the distance learning mode is normally synchronous and is essentially an extension of today's "traditional" classroom. The major benefit is access to better quality resources and reduction in physical space constraints. eLearning facilitates Distance mastery.
The real 21st Century evolution in learning occurs through Time mastery.

Collaborative Learning based on Constructivism is a powerful pedagogic approach that multiplies the transforming power of ICT when used with the right collaborative software tools.
Collaborative learning supports formal and informal learning and the learning benefit comes from both the inherent advantages of asynchronous working and the power of the "net" effect.
Collaborative learning is the key to time mastery and has the power to transform learning and deliver truly Learning Nations.
Time mastery is delivered through use of asynchronous communication and multiple user-driven conferences for segmented, layered and effective communication.
This approach encourages reflection, refraction, understanding, creativity and knowledge building.
Conferencing and threaded discussion facilitates the soft skills necessary for the knowledge economy.
Employers demand employees who can analyse, reason and communicate their ideas effectively when working in flexible project teams.

Stephen Covey's Seven Habits of Highly Effective People advocates a migration from "Dependence" through "Independence" to "Interdependence".
This migration is key to 21st Century Learning as we evolve from the traditional classroom:

- where the student is dependent on the teacher and "you" are responsible for my learning
- through the independence phase, where the student takes more responsibility for "my" learning with the teacher (educator) acting as a guide

- through to the higher level learning facilitated by the teacher (moderator) as "we" move to interdependence and work together, collaborating, participating, debating, discussing, defending and creating in a Constructivism pedagogic framework.

Dependence is synonymous with most classrooms today.
Independence is partially delivered by (synchronous) open distance learning (ODL).
Interdependence is delivered by (asynchronous) open collaborative learning (OCL)

Fear of technology and digital divide issues must be addressed as the future belongs to connected communities and to connected learning communities in particular.
Socialisation/recreation conferences and multiple modes of communication are effective methodologies to encourage users to go online, so they enjoy learning the computer and group skills necessary for online and blended learning.
Dr Gilly Salmon delivers an eModerating course online & worldwide that covers these aspects.

Learning Today

Today's learning is delivered through many separate institutions mostly operating independently.
Life's journey can take us through kindergarten, primary schooling, secondary schooling, further education, and higher education at primary degree level, higher education at secondary degree level, adult education and continuing professional development.
Economic change and a "balanced" life are mandating lifelong learning.
Individuals learning "Silos" are actively engaged in the introduction of ICT and eLearning to improve the learner experience and deliver better results.

Governments, employers, educators, institutions and students are actively engaged in building better silos through the introduction of ICT but in the main the silos stand alone with little co-operation across the groups listed above.
There is a huge ICT skills gap and most institutions are struggling to **use ICT** and do not have the resources to really study how they can make better **use of ICT** from a pedagogic perspective to deliver 21st Century enjoyable education..

Government has a unique opportunity now to take a flexible approach to education and learning.
Traditionally the basis of learning was grounded in the so-called 3 R's of Reading, wRiting and aRithmetic.
21st Century flexible learning must be grounded in the 3 C's of Communication, Collaboration and Content.
This groundwork could be built independently and could underpin all education "silos" and provides a basic framework to support the individual institutions thus delivering a comprehensive and cost effective National (& International) Grid for Learning (cGrid).
The cGrid supports connection across traditional boundaries (designated as silos or containers here) to provide a rich source of collaboration and content sharing across institutes of learning.
Leading to learning as a community activity and thus facilitating life long learning.

Collaborative learning opens education to input across the generations with external input from industry, research laboratories, government, artists and community.
Collaborative learning supports local cultural influence, builds creativity and delivers competence.

Flexible Learning for the 21st Century

Flexible learning is built on the three bases of Communication, Collaboration and Content.

Communication recognises that access not ownership is the key parameter. Thus allowing people to use different access devices at different times of the day. Content needs to be presented on the fly so that appropriate access is available from the many different traditional, current and future devices.
Today's focus on the PC as the access device of choice and the cost of provision of PCs to teachers, students, administrators and parents is a huge stumbling block on the road to inclusive education.
The key is to move the goal posts and get around the blockage by providing universal access and store

user desktop and knowledge databases on secure server(s) thus allowing many users to work from the device at hand as they move through their day.

The key to cost effective deployment is to use software tools that support shared access across devices seamlessly. Users securely log on to their personal desktop on a local, remote or networked server and for the duration of their session they effectively have an ePC. In addition they should leave no footprint behind on the access device once they have ended their session. Their virtual desktop (ePC) should now reflect changes made including updated information, directories, calendars and status. Thus many users can share one access device on a periodic basis.

This single change makes flexible learning an affordable prospect for all today.

Governments/Parents do not have to buy PCs for every student & educator and replace them in future years as they become obsolete or inferior to modern devices.
Flexible learning allows access from many different devices including PCs, wireless devices, PDAs, mobile phones, game consoles, set-top TV boxes and traditional devices such as telephones and fax machines. Learners can use their own, their friends, the library or community devices.
Flexible learning allows users to access and securely use multiple devices as they move through their day. These devices can be in common ownership or community based at suitable access points.

The growth of mobile phone usage dramatically increased the theft of these devices.
Mandatory PC ownership policies will give rise to similar problems but on a larger scale. Many of these PCs are subsidised by Government contributions but Insurers will negotiate terms based on the replacement value.

Content should allow for oral input as well as multimedia to introduce tonality and personality.

The dotcom business era was driven by the premise that "content is king" but the recent dotcom bust demonstrated that users require more than just content to come online and stay online.
Prof Stephen Heppel believes that the key is to provide a service that a user finds delightful.
Successful collaborative communities provide their users with a delightful experience. The ability to support user driven content produces vibrant communities, which work on a proactive basis.

The lessons from successful connected communities allow us to define the ten commandments to deliver on the digital dividend to the benefit of both the developed and developing world.
The collaborative ethos of connected communities allow self help groups to develop, and allow them to easily connect to sources of expertise around the world, without putting an undue burden on the people contributing knowledge, experience, information, wisdom or context.

Post-colonial counties are very wary of suffering from a new wave of online colonialism through constant exposure to imported ideas without the ability to affordably develop their own material.
Techniques such as audio email, history, user driven composition and publishing allow connected communities to tap into their own resources and culture thus avoiding the danger of importing learning that does not support the cultural ethos of the community.

The ten commandments to deliver the digital dividend

These recommendations are drawn from experience, a review of successful communities and the works of leading educators.

1. Access not ownership is the new paradigm for affordable flexible learning
2. Content should be stored once and rendered out on the fly to meet the requirements of the accessing device and support the user, who could have a disability.
3. Users should be able to securely access their desktop (ePC) from the device at hand as they move through their day. The user desktop and knowledge base should reside on secure server(s).
4. Vibrant communities are based on the three pillars of communication, collaboration and content. User driven publication and administration are key to happy users.

5. The user experience must be delightful.
   Provision of social, recreational and networking conferences/calendars as well as learning motivated conferences deliver user satisfaction. Intra-action among the community stimulates delight, enhances self-esteem and can aid in conflict resolution by promoting better understanding.
6. Synchronous communication delivers mastery of distance – the 20th Century Learning Advantage.
7. Asynchronous communication through flexible conferences and threaded discussion delivers mastery of time – the 21st Century Learning Advantage – extending the learning day.
8. Collaborative learning is the key to providing truly connected learning communities
9. Multimodal communication embracing voice, visual and kinaesthetic experience is essential to support all types of learner modes.
10. The connected community is a community of purpose that can be short term, long term or lifelong. Many communities' merit lifetime memberships as the member's role changes over time through learner, mentor, contributor, expert and helper leading to individual self-actualisation.

Closing remark

Connected communities based on collaborative learning can be implemented now by delivering a grid for learning based on communication, collaboration and content. Then building the upcoming school, college, FE, HE, CPD, Adult Education and Lifelong Learning domains on this foundation.
In addition collaborative learning can be delivered now by wrapping a collaborative community around existing learning institutions and organisations.

Connected Communities based on communication, collaboration and content, supported by conversation, customisation, convergence that pay attention to local culture will deliver competent, creative and confident citizens that contribute to society.

Thus delivering the Learning Nation with the skills required for an inclusive knowledge based society.

The communication, collaboration and content commandments underpinning the inclusive eLearning Nation concept, as discussed above, can be extended to deliver affordable, sustainable and delightful eGovernment, eBusiness, eCommunity, eGame and eNation initiatives also.

Many successful Connected Communities are already built on a Common Communications Platform.

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ONLINE BACHELOR OF BUSINESS ADMINISTRATION PROGRAM – ACCESS, DIDACTICS AND RESEARCH ISSUES

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Introduction

The selected issues presented here are embedded in a 3-year-project for the development, implementation and distribution of a new study program at the University of Oldenburg. In 2003 the Department of Continuing Education (we.b) in cooperation with the faculty of economics starts an online Bachelor of Business Administration program for employees of small and middle enterprises (SME). This program is supported by the European Social Fund and was created to offer a solution for the very common problem, that SME loose a considerable part of their junior executives, and among them often the so-called "high potentials", because those aim to an academic degree and go to a campus university. The online program allows employees to combine working, workplace qualification and studying in a virtual learning environment so that they are not forced to leave their companies.

The contents of the study modules incorporate the scientific perspective as well as the special needs of SME. In addition to that general acknowledgement of SME issues the participants can choose and define their own projects strongly related to their professional background for the group project in each module.

Access to University for Employees

The Department of Continuing Education conducted interviews with executives in the regional SME and the chamber of commerce during the last two years. The results of this survey show that junior executives in SME often leave the enterprise one or two years after they have finished their vocational training to go to University for an academic degree program. Most of them never come back and the afflicted individual companies have hardly a chance to stop this trend. An academic degree program couldn't be replaced by comprehensive internal qualifying programs which moreover need investments overtaxing the financial scope of most of the SME. Online degree programs especially developed with concern of the SME context can provide a powerful new tool for personnel development in SME.

Another problem mentioned in the project is access to university degree programs for employees not having the immatriculation standard. Beside the Bachelor program, but already related to the contents of it, there will be an online course program preparing those employees for the immatriculation standard exam.

Providing these innovative ways of access to university for employees, which is a very strong demand of all political institutions of the European Community, makes this project unique in Germany.

Instructional Design and Didactics

Instructional design and didactics are crucial for the success of learners in online programs. Successful and effective learning in virtual environments is only possible in a learning and teaching setting that integrates learning content and materials, forms and ways of distribution as well as mutual means of communication and collaboration. There is only a surplus value in web-based online programs if they provide flexibility for the learner in terms of time and place, offer a variety of means of communication with other learners and the instructors/tutors and integrate individual accompanying possibilities of consultancy in subject and learning matters.

The instructional design of the Bachelor program will be created basing on that attitude. During the last two years the Department of Continuing Education (we.b) engaged in the development of a prototype for instructional design of online study modules in academic degree programs.

Developmental context were several online seminars with graduate students on topics like educational marketing, knowledge management, etc. The result of this developmental process can be described as follows:

Phase name (Duration)	Learning context, materials	Method	Objectives related to	
			subject	learner
preparatory (2-3 weeks)	individual learning with distance education print materials, option to use online learning environment for questions, discussions	self-organized learning with online tutorial support	survey on the subject, homogenisation of the different levels of knowledge in the group	facilitating and empowerment of self-directed and self-organized learning
online test (30 minutes)	individual, test is distributed via internet	multiple choice test with automatic evaluation		building security on own knowledge, self-confirmation
on-campus workshop I (1 ½ days)	learning in big and small groups, refining of prestructured assignments/projects to create group projects	face-to-face input, colloquium, group learning	deepening of knowledge, defining own interests and tasks	enhancing commitment, getting in contact with other learners
project work (12 weeks)	collaboration in small groups on the assignments/projects defined in the workshop	computer-mediated communication, shared-workspace applications, online tutorial support	application of knowledge in the practice, project management	learning about group dynamics and roles
on-campus workshop II (1 ½ days)	learning in big and small groups, group presentations, (video)	face-to-face input, presentation techniques, feedback of experts/instructors and peers	integrating theoretical and practical knowledge	training of presentation and feedback skills

Research Issues

There are three main research areas in the project which are strongly interrelated with the process of development, implementation and distribution of the whole program:

- instructional design and didactics of the modules and the whole program
- training of the teaching personnel (instructors, tutors, experts)
- aspects of implementation and maintenance of online learning environments related to different perspectives (teacher, learner, institution, technical)

Research in this project is seen as an instrument that supports the development, implementation and distribution processes and fortifies the quality management in the program. The approaches of action and developmental research (Dick, B. 1997; Richey, R. 1996) fit very well with that intention.

Three major objectives for research are defined:

- Development of new and/or adaptation of existing concepts of instructional design and didactics for the building and maintenance of online learning environments in academic, communication-oriented contexts. The prototype developed by the Department of Continuing Education serves as a starting point for further development.

- Provision of data about the conditions of effective online teaching and learning from the perspectives of the different participants (teacher/instructor, tutor, learner, institution, technical).
- Development and implementation of an online tutor/instructor training that builds on the data collected.

Closer description of research in the Bachelor program:

Learner's perspective Learner's needs and conditions of successful learning in communication-oriented online learning environments are rarely explored. A first step into the development of more adequate online course settings is the provision of instruments for evaluation of online courses that acknowledge the learners perspective. This is objective for the project in concern of the learner's perspective	**Instructor/teacher/tutor's perspective** The use of online learning environments changes the requirements towards teaching personnel as well as understanding of roles. New learning cultures have to be created and new relationships between teachers and learners have to be defined. The development of new ways of teaching (teacher as tutor, facilitator and learning consultant) basing on data about conditions of effective teaching is the scientific objective in this area.
Institutional perspective The implementation of online learning environments leads to changes in the organisational structure of the university. These changes need professional attendance as they impact the institutional culture and what the institution stands for. Research on the risks and chances of the opening of universities for broader access and public-private partnerships will provide important data for further cooperation in Europe.	**Technical perspective** Today instructional design of online courses is often shaped by the technical possibilities of the learning environment used. Another objective of the project is to deliver feedback on the interplay of technical features, didactics and learning objectives to help create learning environments that can be more easily and flexible adapted to didactic necessities.

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PEDAGOGICAL MODELS AND CURRICULUM RE-DESIGN FOR ON-LINE COURSES

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The problems of many universities in Europe, which want to follow the pace of our american counterparts, is that in the increased use of the web facilities to deliver their courses, the pedagogical models are inappropriate and not well defined. Even those "Open Universities" that already offer distance teaching courses with some or no use of the web, experience similar difficulties.

In this paper, we consider some problems we have experienced in the process of using technology to add value to the learning process, and not to simply automate the existing processes. Technology does offer the potencial to reengineer the curriculum and enable more constructivist approaches. Fully on-line courses are not the ultimate answer. Web-Enhanced courses and Media-Enchanced courses may fit better in some cases. Factors influencing faculty satisfaction with on-line teaching and learning effectiveness are also considered.

If the learning technologies are to be used innovatively, then the curricula in Higher Education should be re-designed, unleashing new opportunities for quality learning.

Many universities are recycling existing teaching materials by putting them on the Web and claiming to be delivering through E-learning. Often, the approach is to re-use old learning processes with the least adaption possible to the new delivery modes. This means that very little innovation is introduced and the added value brought by the learning technology to the process is also very limited. Even the use of sophisticated teaching-learning platforms, such as WebCt, Blackboard and others, may not increase the richness of the course contents, the constructiveness of interaction between the students and of these with the tutor. Hence, the best use of all the design characteristics available in the learning platform is not achieved. This behaviour is in many ways similar to that experienced in the early stages of the use of information technology in the world of business, when many companies used technology simply to mechanise old ways of doing business, and embedded the technology into outdated and often unsounded processes. Pedagogical models need to be redefined and their adaption to the e-learning technologies tested to be sure of its fitness to a different and more requiring student.

ODL by e-learning has been described as a customised learning environment, where the single student must be the centre of the tutor's attention. Most of the learning platforms have attributes that facilitate this job, provided they are fully used and the pedagogical model adopted is also directed in the same sense. The system's flexibility, the accessibility of the learning process, the course materials, the tutor attention, the availability of his/her peers, etc, are paramount but not enough. Every student must feel that he/she is singled out all the time and that he/she is being prefered to the others, so that motivation is being kept high, and the student can easily respond to the high quality criteria of the learning process particularly if that is very demanding to him/her. This is obviously in contradiction with the traditional pedagogical models fur use in the classroom where the tutor, when building up interaction with the class, cannot single out a particular student for obvious reasons. E-learning system's requirements are more directed to the individual student. The system resources are to be fully and well used in the E-learning process. The built in attributes of the system must enable the tutor to create the necessary interactions and keep student motivation and competitiveness at high level.

Our experience shows that all this can be done, provided the appropriate pedagogical model is well defined. The tutor and the students must also be well instructed in the whole process. The tools and attributes available in the leading learning platforms, make an excellent contribution for this purpose.

The well proven pedagogical methods for classroom teaching may serve as a metaphor for the E-learning process. However, the simple use of hypertext (and hypermedia) lecture notes and the virtual

voice-lecture presentation in the form of Power Point slides synchronised with an audio recording of the lecture, may be much richer in contents and in building interaction.

Computer mediated communicator (CMC) tools, such as e-mail, mailing list and on-line conferencing enable students to interact with others and learn collaboratively. Students post messages to the conference for the entire group to see, unlike the private e-mail communication between student and tutor. Such tools offer considerable potential for re-designing the curriculum and enabling the transition to a more constuctivist approach.

Students should engage in active dialogue with each other, reflecting upon experiences and co-operating in the investigation of problems and worthwhile issues. The role of the tutor is to create the learning environment that promotes active learning and to facilitate the learning process. These communication tools can supplement classroom dialogue to good effect and add considerable value to the students learning. In particular the "faceless" nature of the medium has been found to promote a more democratic approach to group discussions, allowing less dominant students to contribute, and sensitive issues to be discussed without the immediacy of peer pressure in the classroom. The asynchronous nature of these tools also brings the advantage of being able to reflect upon a comment.

Fully online courses are not the only ones that can profit from the above characteristics for curriculum re-design. Web-enhanced courses, which use the Web in a useful but incidental manner may be more appropriate for some learning environments. Online materials are provided as supplement or enrichment resources, and learning platforms may be used as a repository for course materials, resource links, conferencing and E-mails. Conventional universities, with a pedagogical model mainly based on classroom teaching may find this mode as the most appropriate.

Alternatively, media-enhanced courses make significant use of the Web as an integral element of the course delivery. The pedagogical model adopted in this case requires a reduced number of class meetings (face to face sessions). Here, online activities play a major role.

Learning effectiveness is a function of effective pedagogical practices. This brings again the fundamental question of which pedagogical model must be adopted that fits better to the chosen instructional strategies and delivery media in order to produce the desired learning outcome for the intended audience.

The factors affecting faculty satisfaction with online teaching vary from the support received in the form of release time for training and development, upgraded hardware and complete course development services. Faculty satisfaction and student outcomes are strongly related. Student satisfaction also depend on a variety of factors such as the quality of the assistance received in the form of orientation, around-the-clock help services, the quality of resources and other facilities usually available in a learning online web-site.

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COMPARISON OF ASYNCHRONOUS AND SYNCHRONOUS LEARNING MODELS

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Introduction

The aim of this research is to determine suitable learning model at university campus. Both Asynchronous and Synchronous models have advantages and disadvantages with respect to implementation at the university campus. This comparison was done paying attention to course administration, collaboration, assessment capabilities tracking and reporting.

Learning models

Asynchronous and Synchronous models comparison was done using Lotus corporation software LearningSpace forum (as Asynchronous model) [4] and LearningSpace 4.0 (as Synchronous model) [4].

LearningSpace 4.0 features provide not only the most flexible learning experience for students, but the broadest support for curriculum planners, instructors and administrators, as well as the management controls, flexibility and scalability to meet the needs of the enterprise.

Multiple learning modes

The two LearningSpace modules — LearningSpace Core and LearningSpace Collaboration — provide support for the three delivery modes for online learning experiences. LearningSpace Core supports self-directed study. LearningSpace Collaboration includes the collaborative elements of the award-winning Lotus products Domino and Sometime to support asynchronous collaboration through online discussions and access to shared materials, as well as real-time "virtual classroom" sessions:

- **Self-directed.** The LearningSpace Core module provides robust functionality for delivering self-directed courses with tracking and assessment. These courses can easily incorporate content from any Web-based source or CD-ROM. LearningSpace Core can deliver and track any AICC-compatible off-the-shelf courseware as well. Self-directed courses can be highly structured with controlled paths and prerequisite assessments, or provide flexible learner access to suit individual learning needs.
- **Asynchronous.** The asynchronous collaboration functionality in LearningSpace Collaboration provides support for discussions and project teams, with access to class materials, exercises, and assessments. It is especially useful for problem-solving exercises, a forum for questions and discussions initiated by learners, and for reinforcing learning done through self-directed study and real-time classes.
- **Virtual classroom.** LearningSpace 4.0 creates a rich virtual classroom environment for real-time sessions with audio and video, shared whiteboards, shared applications, electronic hand-raising, a participant list, private messages, and chat functionality. In LearningSpace 4.0, real-time sessions become activities in the curriculum that can be integrated with the AICC-compatible tracking and assessment functionality

Learning modes [1]		
Synchronous Learning that provides real-time, simultaneous access to content, instructors, and other students. People from throughout the enterprise come together at a specific time, but without leaving their offices or homes.	**Asynchronous** Learning that takes place online, but on the learner's own schedule. Collaboration with others takes place via online threaded discussions freed from the barriers of time and place.	**Self-directed** Learning that empowers people to control the speed of their own learning. A single learner proceeds through the course material interactively on an ad hoc, individual basis, without collaboration with other learners or an instructor.

LearningSpace Collaboration allows organizations to enhance self-directed and asynchronous courses by creating opportunities for communication between students and teachers. A discussion can be created to augment any course. Instructors can use the chat functionality to maintain online office hours. These collaborative capabilities allow learners to work with each other to learn from their colleagues and instructors.

Asynchronously, learners can add comments and ask questions in the discussion area. Synchronously, learners can have real-time awareness and instant messaging, as well as participate in real-time virtual sessions with an instructor and other learners.

The combination of all three modes of learning in a single platform provides the utmost in flexibility. LearningSpace 4.0 supports the existing courses in use in the enterprise. And it supports the creation of new courses using two or three of the modes to provide the richest e-learning experience [3].

There is a Distance Learning classroom in VGTU that has all necessary equipment for videoconferences and asynchronous learning. That is why we had to choose software to satisfy Distance Learning classroom’s needs. For this purpose we have done LearningSpace technologies analysis and put the results in table 1.

Table 1. LearningSpace Forum compared to LearningSpace 4.0

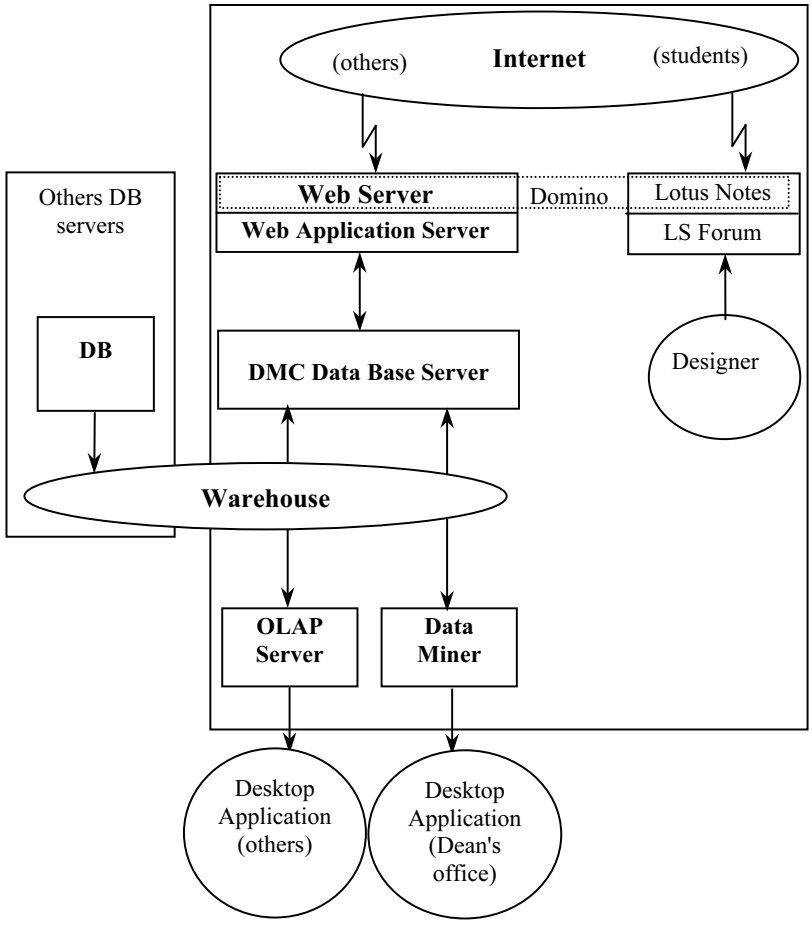
LEARNINGSPACE FORUM compared to LEARNINGSPACE 4.0	**LS Forum**	**LS 4.0**
General		
Browser Support for Students	Yes	Yes
Browser Support for Admin/Creation/Instructor	No	Yes
Automatic completion of modules based on a pre-test using trigger scores	No	Yes
Supports Template development	Yes	Yes
Hyperlinks to other sites	Yes	Yes
Supports Java	Yes	Yes
Supports mail interaction, using users' native mail, between students and instructors	Partial	No

Registration/Catalog		
Course Prerequisites	No	Yes
Enrollment by Instructor/Administrator	Yes	Yes
Enrollment by Student	No	Yes
Create registration rules	No	Yes
Supports curriculum paths for individuals, positions or curriculum paths	No	Yes
Supports reusable course modules in more than one curriculum	No	Yes
Collaboration		
Asynchronous collaboration	Yes	Yes
Threaded discussions last after end of class	No	Yes
Hand-raising to ask questions	No	Yes
Ability to have discussions with instructors	Yes	Yes
Chat facility between students and instructors	No	Yes
Classroom group coursework	Yes	No
Online question and answers	No	Yes
Tracking, Reporting & Management		
Tracking and Reporting including course completion	No	Yes
Provides standard reports	Minimal - 1	Yes - 17
Supports additional reports	No	Yes
Wizard style interface prompts users to enter report parameters such as courses and students	No	Yes
Provides Graphical Reporting Capabilities	No	Yes
Assessment Capabilities		
Ability to track client assessments	Yes	Yes
Includes test logic (Go/No Go; If/then	No	Yes
Stored Bank of reusable Question	Yes	Yes
Auto Grading and Auto Records	Yes	Yes
Questions: T/F, Y/N, Matching, Fill in the Blank, Multiple Choice (1 or many correct answers).	Yes	Yes
Graphical choice and 'drag and drop'	No	Yes
Supports Timed Tests	No	Yes
Supports Weighted Questions	Yes	Yes
Infrastructure		
Uses Notes NSF file to store contents	Yes	Optional
Domino Name & Address Book	Yes	Partial

Domino Infrastructure	Yes	No
Multiplatform Support	Yes	Future
Utilizes RDBMS to store system and (optionally) course data objects	No	Yes
Native Notes Client Accessible	Yes	No
Disconnected User	Yes	No
Database schema open for modification	Yes	Yes

Learning Space 4.0 is an independent product and like other learning software for synchronous model as compatible with other technologies. There are a lot of requirements for hardware and software to install his product. That is why we have chosen Learning Space Forum in the process of foundation of Vilnius Gediminas Technical University (VGTU) Distance Learning information system.

VGTU Information Technology Department is "IBM Certified for e-business University Initiative" [5] and has an opportunity to use IBM providing software for creating an interactive learning environment. The material of synchronous learning is difficult to place in data basis or warehouse. That is why we prefer asynchronous learning while creating VGTU Distance Learning informational system. Picture 1 shows how is organized the structure and what products are used to create network computing architecture [2].



Picture 1. Network Computing Architecture at VGTU

The scheme shows that Learning Space Forum is quite an independent course creation technology and it can hardly be integrated into the common VGTU Distance Learning information system.

Conclusion

Synchronous learning model delivers a flexible, standard-based platform for the delivery of all types of e-learning, makes it possible to administer course catalogs and learner populations, support for the creation, management and delivery of all modes of online learning. On the other hand asynchronous learning model is more suitable for distance education needs due to flexible classroom group course work and possibilities to use mail interaction while using user's native mail.

From the point of view of infrastructure asynchronous learning model is an independent platform, which could be implemented, in an expensive mode. Because of the difficulties occurring while placing synchronous learning material in to the university information system, we have chosen to use asynchronous learning model.

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LABNET PROJECTS AND ITEM LAB: A CENTRE FOR *ed-L* (ELECTRONIC AND DISTANCE LEARNING)

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Introduction

ITEM (Laboratorio Nazionale per l'Informatica e la TElematica Multimediali) is the National Laboratory for Computer Science and Multimedia Systems. It was founded at the beginning of 2000 as an effort of CINI.

CINI (Consorzio Interuniversitario Nazionale per l'Informatica) is a consortium of Computer Science and Computer Engineering research groups operating within some Italian Universities. It was built in 1990 as a non-profit organisation to promote the cooperation of Italian computer scientists and engineers in nation-wide and international projects in the area of computing and data communication. It is currently formed by 11 major Italian Universities and receives support by the Ministry for University and Research (MURST) as well as by the Ministry for Industry. Similarly to other consortia recently activated across Europe (e.g. Teltec in Ireland) the research activities are performed by the research units located in the member Universities, or via structures created ex-novo by the CINI.

ITEM is the first laboratory established by CINI. ITEM is located in Napoli, thanks to a specific agreement with the University "Federico II" of Napoli that hosts it. It was created thanks to a grant of the Italian Ministry for University and Research and has up to the present a staff of 10 researchers, rapidly growing in size. The Laboratory has a specific objective, i.e. tackling research and technological issues in the area of distributed information systems, with a particular focus on deployment of multimedia applications and services, and design, control and management of complex network infrastructures. In spite of its very young age, ITEM is already involved in several research projects related to multimedia communications and e-Learning applications. In particular, it takes part to a group of national research projects for experimenting technologies in the area of remote access to research infrastructures and laboratories (LABNET), and to an IST Program project in the area of QoS over IP networks (CADENUS). ITEM currently includes three research units: Distributed Computing Architectures; Network Infrastructures; Multimedia Applications and Services. All of them can rely on a state of the art research infrastructure that includes clustered multimedia servers, a QoS aware network testbed for multimedia and VoIP applications, and a multimedia technology workshop.

This work explains in details LABNET projects, in particular organization and services for the e-learning activities.

LABNET Projects

Labnet projects aim to improve the learning skills both of students (master degree and undergraduate school) and employees of enterprises (small, medium and big). Such a wide range of opportunities is meant for granting a flexible learning structure. Even though Universities and schools are used to doing experimental activities on the real and complex devices, they usually have problem in the field of purchase and management costs as well as in the lack of staff able to use this infrastructure. Both small and medium enterprise and big corporate can experimental this kind of difficulty. Main Labnet goal is to make from a technical and a managing viewpoint students manage real laboratory (centralized or distributed) remotely accessible providing them the necessary infrastructure. Indirect educational benefits of this approach rely on the possibility of having students work together on a virtual platform so that they can talk about the current experiment, the obtained results and all concepts related to it. Real equipments with high complexity (radio communication devices, industrial robot, network and TLC equipments, electronic and electrical measuring equipments, biomedical devices) are remotely controlled by students located on several sites while the supervisor supports all activities concerning the remote experiment and follows each step constituting the trial. The first step toward the ultimate realization of the Laboratory is the release of some prototype useful for application testing

and for the success of the initiative. Common target of Labnet projects is the realization of an IDS (Integrated Didactic System) able to make remote resources accessible to both teachers and students located in several sites thanks to interfaces and integration of systems and multimedia technology. The IDS is made of four different entities based on peculiar learning needs and different kind of network technology:

- Primary Labs: most of researching and learning activities is carried on in this lab. The main peculiarity of this lab is the kind of experiments (more complex). Typical are: a big number of users and constraints on the network bandwidth available as well as on other Quality of Service parameters.
- Secondary Labs: due to different typology of experiments, these sites are characterised by less requirements for bandwidth availability respect to Primary Labs.
- Primary Classrooms: essentially classrooms belonging to learning and education foundation such as University, Companies and Centre for continuos learning with a big number of users and more needs for what the network bandwidth concerns.
- Secondary Classrooms: they are essentially classrooms belonging to learning and education foundation such as High School and Elementary School.

Labnet projects are structured in order to satisfy operating IDS needs and to solve e-learning technological and methodological problems. Such objective is obtained both by integration of existing technologies based on heterogeneous and complex systems (in the short period) and by development of innovative technologies and implementation of specific prototypes (in the middle period). Labnet projects are the following:

- LABNET1: research and learning activity in Telecommunications area.
- LABNET1-Infrastructure: whose aim is to guarantee the infrastructure for LABNET1.
- LABNET2: research and learning activity in Computer Science and Multimedia systems area.
- LABNET2-Infrastructure: whose aim is to guarantee the infrastructure for LABNET2.

Therefore, the integrated Labnet projects represent an innovative solution in the context of interactive and remote learning on real laboratories in Telecommunications and Multimedia area.

Reference Scenario

To obtain its objectives and realize the IDS, CINI consortium planned four types of actions:

- ITEM Laboratory for Multimedia technologies and Communications issues.
- Design and implementation of network architecture for access to remote lab.
- Design and implementation of network architecture for classrooms (University and School) connection.
- Restructuring legacy research laboratory in order to include it in Labnet network.

As far as scientific and technological goals, the following aspect will be developed:

- Use of infrastructures realized during the activities listed above.
- e-Learning applications.
- Design and implementation of tools meant for controlling Measuring equipments.
- Design and implementation of tools meant for controlling Robotic equipments.
- A framework in order to test the tools developed on the field (University, School and Corporate).

Taking into account the realization of an infrastructure for the access to remote laboratories the open issues depend overall on the lack of interoperability between, on one hand, the legacy software applications and, on the other, the measuring equipments in order to obtain a real remote control on the device involved in the experiment. Another problem to solve is the interoperability between different software applications working to exchange data on a certain number of heterogenous network platforms. Labnet projects aims to realize a platform (hardware and software) capable to solve these limitations derived from actual constraints.

Among the numerous remote experiences, Applied Physics (Atomic, Molecular and Optical Physics and Superconductor Science and Technology), Electronic and Electrical Measuring and Robotic Control are particularly interesting.

Regarding the robot studies, thanks to PRISMA Lab of Computer Science Department of University "Federico II" of Napoli two industrial robot (Comau SMART-3S) and 12 stations of PLC (Programmable Logical Controller) Allen-Bradley are available. Using these equipments it is possible to fill the gap when the people studies the industrial control and automation. Typically these equipments are very expensive and very difficult to manage. Furthermore, the lack of skilled operators is another problem to face. Hence, to use these devices remotely under the control of professional operator is a valid way to allow both Universities and Companies solve these problems. Thanks to this approach is guaranteed to the students located in the remote site the use of robot and PLC. The application developed in this area will be useful for many other peculiar scenarios like telecommuter.

In the Electronic and Electrical Measuring field Labnet projects aim to two kind of targets: the implementation of a "Tele-didactic" system and the realization of "Tele-measuring" platform. In the first case the software architecture uses a typical browser web in order to show the possible experience and a client-server application control and manage the measuring. In the second case it is possible to measure the precision and the accuracy of a device: connecting the device to Labnet network it will be realized the device calibration.

In order to realize Physics experiments ITEM lab currently collaborates with LAFIDIN (LAboratorio FIsico DIdattico a Ingegneria) lab of the University "Federico II" of Napoli. LAFIDIN lab makes available 25 measuring stations with Scientific instruments and Educational Science Equipments. All experiments available in LAFIDIN lab are supplied with documentations like technical reports, master degrees and multimedia and interactive supports. Physics experiments are a key step in the curricula both for University students and for Secondary school students. While in the University there are many Physics labs, on the contrary, in most of Secondary schools there is a lack of these labs and over all of technical operators. The cooperation between ITEM and LAFIDIN gives a chance of overcoming these difficulties.

Labnet projects are structured on six workpackages and the workpakages in turn are structured in activities. The workpakages are the following:

- WP01: Project Management.
- WP02: Management of Computer Science and Informative System.
- WP03: e-Learning technology.
- WP04: Remote automation technology.
- WP05: Remote measuring technology.
- WP06: Planning, supplying and valuation of e-learning experiences.

To avoid the drawbacks of "*virtual experiences*" ITEM Lab has achieved a Network and Multimedia infrastructure able to satisfy all requirements related to multimedia issues: storage, management, processing and streaming of multimedia contents. In this context is designed and implemented a "Remote Desk" to allow recording and real time streaming of lessons and seminars from ITEM site to Internet as well as to Primary and Secondary Classrooms. The "Remote Desk" configuration is as much as possible simple and automatic so that it can be used by inexpert teachers too. Actually, the "Remote Desk" schema is based on a hardware-software system in which video, audio, slides and documents (experiment videos or simulation) can be automatically integrated. Video contents are made using remotely controlled digital video camera with semiautomatic tracking. Multimedia documents are stored into server farm (for asynchronous access) and transmitted on the "*LABNET channel*". These results have been obtained thanks to the integration of architectures developed at the University of Napoli. In particular, two Video on Demand applications (named MuSA and DiVa) have been customized in order to allow, respectively, the storage on servers cluster and the streaming with VCR-like functionalities.

Next to these issues there are the aspects related to the network connections. Labnet infrastructures currently are connected to Internet by a leased line but all labs will be soon connected to the Italian Research Network (GARR) and to a broadband version of GARR, GARR-B. Thanks to bandwidth available on the GARR-B network, it will be possible to connect Labnet infrastructures to other Italian research centres and to share resources and experiences. To foster collaboration activities, we are studying new Tele-Collaboration and e-Learning solutions.

In the end, Labnet projects will provide remote access to real laboratories on large scale (home and mobile users) as soon as the network connectivity in Italy guarantees ADSL and ISDN technologies at low cost, so that students do experiments or follow a lesson by their personal computer at home.

Conclusions

This work gives only the general aspects for what the Labnet projects as well as objectives regards. Technical way by which this e-learning system is performed is out of scope of present paper. We have already planned to submit another paper to the EDEN Annual Conference about software and hardware architectures implemented in order to explain the technical and scientific details on which an e-learning experience rely.

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E-LEARNING IN AUSTRIA – SCHOOLS IN CHANGE – NOTEBOOK-USE IN SECONDARY SCHOOLS

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Introduction

Research aim

"Schools in change" is an empirical-didactic, supervisory investigation done by the centre for education and media for the Ministry for Science and Art. Research period: 12/2000 – 2/2002.

The aim of the study "Schools in change" is the qualitative investigation into the use of notebooks, taking into account findings already made on an international plane.

Project

The evaluation of the 418 pupils in total, aged between 14 and 20, began in December 2000 for the six-member team of the centre for education and media. In parallel with the initial contact with the responsible people on the spot and the investigation of the respective school situation by means of questionnaires to heads of schools and teachers, the installation and implementation of a web space on the part of the evaluation team followed, to guarantee an online-exchange of information and information-flow between the centre for education and media, the Ministry for Science and Art and the notebook schools to be evaluated.

The empirical study of all the pupils involved in the project was carried out by means of online-questionnaires. The first survey was completed in spring 2001 and evaluated for the interim report (see: wbt.donau-uni.ac.at/notebook/Archiv/nb-eval-zwischenbericht.pdf).

Parallel to this, the evaluation team installed and completed a webspace in order to ensure an online exchange of experience and information flow between the center for education and media, the Federal Government and the notebook-schools. (cf.: http://wbt.donau-uni.ac.at/notebook).

The second part of the evaluation started in September 2001, also with an online-questionnaire for the pupils. Selected pupils, called "researchers", sent back online-questionnaires with daily reports on the use of the notebooks over a period for 14 days, first in October and than in December. The field researchers conducted in-depth interviews and observed the teaching methods over a number of days.

Overwhelming acceptance

The use of notebooks in education means for the great majority of those involved in the notebook-project employing a forward-looking technology and thereby being able to highly motivate the pupils. The networked method of work independent of locale is welcomed.
The degree of motivation ascertained for pupils is in fact very high at 80 %.

The school heads hope to fulfil the expectations of industry and to raise the image of their schools by participation in the project.

Who pays?

The way the necessary equipment is acquired is new. The notebooks are overwhelmingly paid for by the parents. The danger of a cultural divide through the creation of financial elites is feared.

Use of equipment

The majority of the teachers claim that they use the notebook almost daily and in nearly all subjects, especially languages. The great amount of preparation for the notebook-lesson is seen as a disadvantage.

The pupils mainly use the notebooks for presentation, research in the Internet and for word-processing and – to the chagrin of many teachers – for playing.

Effects on the teaching

45 % of the pupils questioned declare that the notebook has a positive effect on the teaching style and on of their learning success. The desire to stay in the notebook-stream (which means keeping moving up classes) is seen as a learning incentive.

The pupils appreciate the practice-oriented and up to date teaching and pay tribute to the high amount of preparation done by their teachers.

The field research gives an extremely positive image of the work in the notebook classes.

Quality shortcomings – of a didactical-pedagogical nature or in possibilities of technical implementation are observable only in the academically-oriented schools.

In the higher vocational schools, work with the notebook is unproblematic. The majority of the pupils are already connected by Internet with the teacher, also outwith the school.

Homework, exercises, targeted preparation for exams and exams themselves are exchanged online and supervised by a tutor.

The teachers are highly committed and show evidence of a new didactical approaches.

External problem fields

Training/preparation: 47 % of the pupils consulted find fault with the poor or inadequate skills or ideas of their teachers.

40 % of the teachers complain of the very high degree of preparation necessary for the notebook-lessons. The pupils show a mastery of "multitasking".

Ergonomy/equipment: 34 % of those consulted identify an enormous lack of suitable ergonomic equipment in the notebook classes.

Cabling is still a problem. Wireless-LAN-connection would be an optimal solution.

Finance/discipline: 31 % see the financial burden caused by the purchase of notebooks as a problem, while 30 % note didactical problems and discipline (performance checkes, contact).

Internal problem fields

Online-exchange, online-teaching, online-tutoring

Regrettably, there is hardly any (in my opinion necessary) online-exchange between the teachers concerned. The enormous potential for training capacity through the experience which is gained in the notebook classes is not only present but should be utilised. An exchange of knowledge among the teachers either doesn't happen or only hesitantly.

Possible reasons for this could lie in the fear of their own deficiencies and/or in a not very highly developed critical ability. The teachers lack the possibility of presenting their achievements externally. Excellent, committed work not appreciated or remains hidden behind closed classroom-doors.

Wbt-forum

Grafic: wbt-platform of the centre for education and media

The teachers coordinating and leading the notebook project make little or no use of the notebook forum – installed by the centre for education and media.
It is evident that online-forums must be constantly activated in order to be viewed and appreciated as a meaningful possibility of communication.

A look into the future

A look into the future allows as to recognise some main points:

- fear concerning higher costs and thereby a social selection in the training (cultural divide)
- necessary development of new forms of teaching and learning
- new media are regarded as being nothing exceptional
- specialisation of pupils; multitasking

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TERTIARY DISTANCE EDUCATION IN A DEMOCRATIC SOUTH AFRICA: QUO VADIS?

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Introduction

South Africa is a developing country with vast rural areas in which optimal access to tertiary education is clearly not through traditional forms of contact education but through some form of traditional distance education. A large percentage of the activities in distance education in the tertiary sector in South Africa is done either directly or through an agreement with one of the 21 universities or one of the 15 technikons in South Africa. All of these institutions are public institutions and therefore fall under the jurisdiction of the national Department of Education. Their combined enrolment is close to 600 000 annually for the past few years.

The need for tertiary education

The delivery of tertiary education should be accelerated since there is from a social and a political point of view a desperate need to develop the people of our country and from an economic point of view a need to alleviate the shortage of skilled manpower. To reach the goal spelled out in the vision[1] *"To achieve and promote economically productive rural communities that are aligned with the national economic social ideals and goals of the democratic South Africa"* education must certainly play a key role.

Delivery problems for tertiary education

The delivery of tertiary education in the rural areas is severely hampered by poverty, insufficient infrastructure, HIV/AIDS and other health problems and a disrupted schooling system. Dropout rates due to poverty, illness, lack of motivation and trauma are set to increase. Absenteeism among children who have to support or even act as heads of households or those who help to supplement family income is bound to rise. These children could be lost for the tertiary education sector due to non-completion of their school career, poor matric results or difficulty in attending a university or technikon. Distance education may play a major role in addressing these problems but adaptations of traditional delivery methods should be made in an attempt to include these students in the main stream.

The seriousness of HIV/AIDS and the impact it has and will have on the tertiary education system can hardly be overestimated[2 and 3]. Already the majority of deaths occurring in South Africa among people aged 15 to 49 years are caused by HIV/AIDS. The infection level for university undergraduates is estimated at around 22%, for university postgraduates around 11% and for technikon students around 24.5%. It is also predicted that these figures are still rising sharply.

New directions in tertiary education

The post-apartheid government has, even before its inception 1994, started producing plans to "transform the tertiary educational landscape" in South Africa. The direction they are aiming at was made clear in July 1997 with the release of *White Paper 3*[4]. This was followed in June 2000 with what is now called the *Size and Shape Report*[5], produced by the Council for Higher Education, which contains a range of proposals and recommendations on reconfiguring the tertiary education system. On receiving this Report, the Minister of Education indicated that the Government's response should be to formulate a national plan to establish size and shape, growth and participation rates and institutional configurations. The eagerly awaited *National Plan for Higher Education*[6] was released early in 2001 and it was made clear from the outset that the Minister was adamant that it would be implemented within an ambitious timeframe. The overall aims of all three these documents are clear:

The Government is going to reshape the tertiary education landscape in a regulatory way. Many academics in South Africa certainly agree with many of the recommendations of these documents, amongst others that the system as a whole should become more representative of the population of our country. However, some recommendations seem to us to be against international trends.

Implications for distance education

These plans include, for example, a serious reshuffling of the South African role players in distance education by insisting that a single dedicated public distance education institution be formed. The proposal is that a merger takes place between the existing public distance education institutions University of South Africa (UNISA), Technikon Southern Africa (TSA) and Vista University Distance Education Centre (VUDEC). The new institution is to be called the Open Learning University of South Africa (OLUSA). Part of the difficulty in merging these institutions lays in the fact that UNISA and TSA have completely different institutional cultures; also VUDEC feels threatened to be swallowed by these two giants. This process is driven hard by the Minister of Education resulting in much tension and bad publicity for all involved; even court interdicts and hanging court cases are in the air.

The success of mergers depends on a number of factors, some of which are difficult to anticipate and control. Although cost saving might be achieved by a merger, the Minister has already indicated that all delivery sites will be retained[7], thus limiting the scope for cost effectiveness. Even the traditional contact institutions feel threatened by this process since the perception lives that OLUSA will be protected against competition from contact institutions and a number of them developed programs which are delivered through different forms of distance education. Against this background it is ironic that "foreign" role players in distance education who are not operating physically within South Africa are not touched at all by these regulatory ideas.

Provinces without own institutions

With the creation of a nine-province system (replacing the old four-province system) in South Africa, two provinces, Mpumalanga and Northern Cape, resulted that do not have their "own" universities. This has lead to them lobbying for own universities with the Department of Education. Not surprisingly, this is addressed[6] in that the Minister appointed consultants to lead Working Groups to advice him on how to address the tertiary educational needs of these provinces. These Working Groups were to submit reports to the Minister by the end of 2001 and the outcome of this process is eagerly awaited by all concerned.

It was part of the brief given to these Working Groups that new universities will not be started in these provinces. It is therefore highly likely that some form of clearing house for the delivery of tertiary education will be started in these provinces involving existing institutions elsewhere and using some form of distance education to do so. Will this be done involving only OLUSA? If so, why then start something local in these provinces at all? If not, will the involvement of contact institutions not be a competition for OLUSA?

Subsidy: Implications of the proposed new funding framework

The present framework is essentially market-driven in that it is based on a head count. The proposed new funding framework for supporting public tertiary education institutions will use block grants, which will include a teaching input subsidy, a teaching output subsidy, a research output subsidy and an institutional set-up subsidy as well as earmarked funding meant to achieve specific purposes. The aim is[2] "to fund institutions in line with their real, rather than hoped-for delivery capacities".

The National Plan for Higher Education indicates that goals and targets formulated in the Plan will be achieved through the planning process in conjunction with funding in an appropriate regulatory framework. Each institution is to submit a three-year rolling plan and the Ministry shall advice institutions of adjustments which should be made to their three-year rolling plans. Places will be awarded to each institution, based on their approved three-year rolling plans. This process of approval will empower the Ministry to steer the higher education system through both price and quantity

mechanisms. The link between planned full time equivalent student enrolment and funding implies that teaching subsidies shall not be paid to institutions solely on the basis of historical student enrolments.

The subsidy per distance education student, in the present formula, is 66% of the corresponding subsidy for a contact student, both based on so-called full time equivalent students. It is proposed that this drops to 50% in the new funding framework. If implemented, such a decision will seriously affect the delivery of distance education by traditional contact institutions but also by OLUSA.

Conclusion

The tertiary education system in the new democratic South Africa is being transformed in a hard-handed, regulatory and undemocratic way by the new Government. Trends to allocate student places, to partition contact and distance education into different institutions, to forcefully merge existing successful institutions and to use funding and one-sided planning to implement this transformation seem to us to be against international trends in tertiary education.

The new democratic South Africa poses new challenges to the education sector. "The inequalities in our system in terms of access, programme offerings, quality and infrastructure are acknowledged. The question is not whether the identified outcomes are desirable but how to achieve these outcomes whilst balancing *change, stability* and *autonomy."*[7]

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ANALYSIS OF E-STUDIES DEVELOPMENT IN LATVIA

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Introduction

The essential prerequisites for the development form of Computerised Distance Learning or E-studies of such learning programs in the World and in Latvia have been analyzed in this paper. The essential application programs and the prerequisites for the development of such learning programs have been evaluated taking into account further development of the E-studies system. The experience gained in the process of education of the students of E-studies at School of Business Administration Turiba (Latvia) has been analysed.

The tendency of the World

The E-studies market is constantly growing world - wide. The extent of corporative E-studies market in the US was estimated at around $ 1.1 billion in 2000 and is foreseen to grow up to $ 11.4 billion by 2003 [1].

The most active development of E-studies is in the US where international programs are being created with the support of corporate universities [2].

Education in most European countries is state financed and therefore E-studies are also financed in the form of international projects and state investments, e.g. [3] (http://www.pggda.pl/dec).

The approach towards the implementation of study program using IT also differs taking into account the above mentioned. The cost of implementing individual courses is high, although it is profitable in the US [4]. In order to ensure the commercial feasibility, such courses envisage a minimum of 120-students per year who pay a fee of 1590 $ per course.

The provision of electronic study material is important for the study process, e.g. US library Holdings offers more than 350 E-magazines and about 16,000 E-books [5].

The involvement of a large number of students in the study process is essential for its economic feasibility.

A range of strategies can be used for the development of the study material – self created, adopted from others or jointly created by several partners. Each method has its advantages and disadvantages.

The development of the study process on the Internet could be achieved using universal programs and qualified specialists – programmers and web designers or using specialised web based programs that could be tailored to meet the requirements [6].

Specialised web based study programs, e.g. ”Learning Space” based on "Lotus notes" are available in Latvia. “Quickstart” a new modification of “Learning space” costs on average about 30,000 –50,000 Euro. Such programs require a renewed licence for new users thereby increasing the cost for additional users.

As seen from the survey (review) the initial costs are considerable but with the increase in the number of students E-studies become more cost effective than traditional classroom studies.

The world - wide development of E-studies is owing to the increase in the standard of life and the willingness on part of the members of the society to spend a considerable part of their income on education. Although fees in several Latvian higher educational institutions are commensurable with their Western counterparts, the income level differs considerably.

E-studies possibilities in Latvia

E-studies possibilities basically depend on technical – Internet access, financial – study fee, as well as on the willingness to adopt a new learning process.

In order to develop a teaching centre on the Internet, it is necessary to ascertain the student profile, and to ascertain the ways of contacting them and the potential advertising forms that could attract potential students.

Surveys in the form of one day questionnaires are conducted regularly on the Latvian Internet portal DELFI. The survey reports that a comparatively large number of people refer to the Internet as the main source of information, which shows its rapidly growing significance in the sphere of information and that it is becoming more common (fig.1).

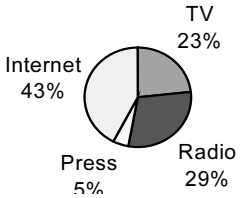

Fig. 1 Sources of information for Internet users. Number of respondents – 2412

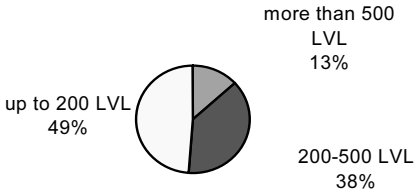

Fig. 2 Average income of Internet users Number of respondents - 3493

The number of potential students for a commercial higher educational program is certainly greatly dependent on their financial possibilities (solvency). Reports from surveys show that more than 50% of Internet respondents could pay 650 LVL/year, the fee for professional higher educational Business administration program offered by School of Business Administration Turiba (SBAT) in the form of E –studies (fig. 2).

Results of the survey on the Internet portal DELFI show the number of potential students willing to enrol for the Business administration E-studies program (fig. 3).

Factors promoting and hindering E-studies

SBAT is the one and only higher educational institution offering a Business administration program in the form of E-studies in Latvia [7,8,9,10].

The results of the current students survey fully enumerates all the advantages of E-studies (fig. 4) – opportunity to combine study and work, self paced study schedule, opportunity to access all necessary study material using the Internet.

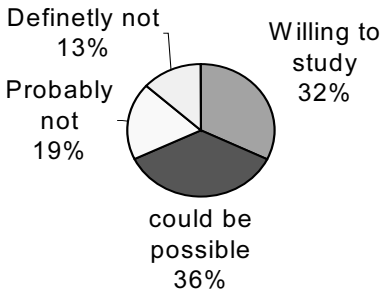

Fig. 3 Willingness of Internet users to enrol for the Business administration program on the Internet. Number of respondents - 1654.

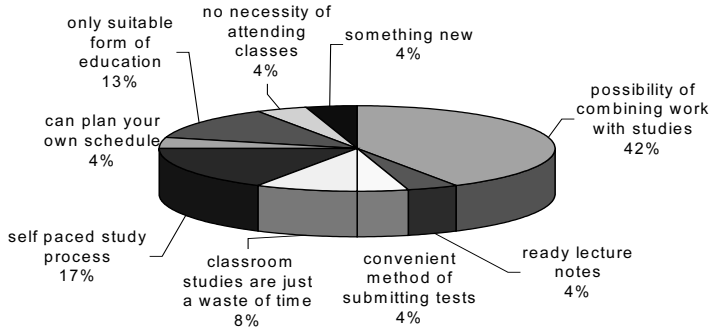

Fig. 4 Reasons for opting for E-studies.

The results also show the risk factors relating to the termination of the study process (fig 5). Approximately half of the students use the Internet at their place of work and therefore avail it free of charge. None of the respondents cite the non-accessibility of the Internet as a factor for the termination of their studies; on the contrary other forms of education do not suit them. This certainly shows the potential possibilities of such a form of education in Latvia.

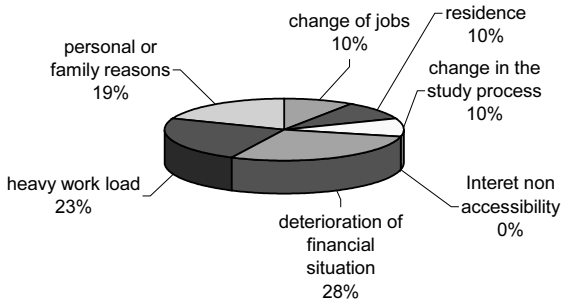

Fig. 5 Evaluation of the risk factor involved in the termination of studies.

On the other hand it is not easy studying an E-studies course, as it requires great organisational skills, regular job and a stable income (fig.6).

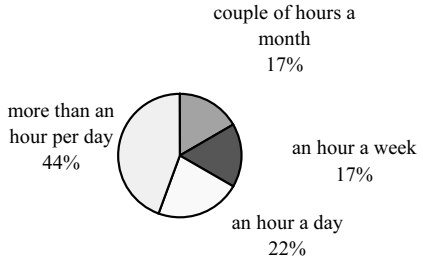

Fig 6. The time spent for E-studies.

Conclusions

1. Internet studies using modern technology has a bright future as is reflected by the experience world - wide. The initial costs necessary for the development of the study material hinder the widespread development of this form of studies in Latvia.

2. The relatively small number of Internet users restricts the widespread development of E-studies in Latvia.

3. The results of student and mass surveys indicate the increase in Internet accessibility whereby it would cease to hinder the organisation of the study process in electronic form and combining all the resources in the development of study material, E-studies could be developed rapidly in Latvia.

4. The speed of Internet connections in most parts of Latvia does not allow for the development of study process using modern Internet technologies, such as video conferences and video lectures that are popular in other countries.

5. There is an influence of the globalisation on E-studies in Latvia in the form of programs offered to Latvian inhabitants by international institutions from other countries. The effects of this influence are not felt so strongly as the medium of instruction is often English and the fees relatively high. However, Latvian institutions could face strong competition in the future.

6. In order to compete with international institutions, Latvian institutions have to actively develop the study material in different spheres and offer various programs on the Internet. Co operating with different higher educational institutions and joining forces, it is possible to develop high quality study materials, a prerequisite for the development of Virtual university in Latvia.

Gratitude

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THE LEGACY OF DISTANCE EDUCATION: A CASE STUDY OF TRANSFORMATION

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Legacy Program

The traditional model of distance education - guided independent study - follows a pedagogically integrated, cognitive systems paradigm [1]. It makes use of specially designed and developed learning materials that are, by and large, self-supporting and for the most part do not require the intervention of the teacher [2; 3]. In this paradigm, tutors often play an important role after delivery of the materials to students. Materials developed for guided independent study contain explicit and implicit didactic techniques for initiating, facilitating and maintaining relevant study processes. These techniques influence the study process by making it more efficient, more effective and/or more satisfying for the learner [3].

Materials are usually developed in teams according to an industrial approach in which different actors, according to a more or less standardised procedure, fulfil different roles in the design, development, delivery and student use of the materials for large groups of learners.

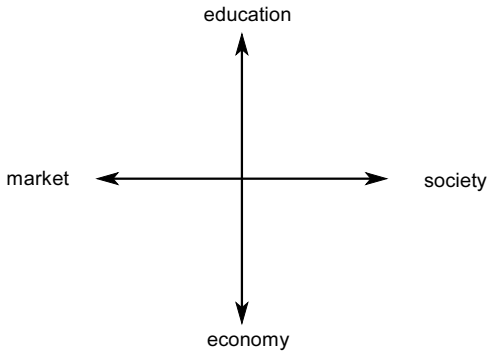
The Transformed Vision

The new system - interactive or networked multimedia education - follows a more flexible, personal, competence based, interactive (constructivist) paradigm for learning within learning communities [1]. It is an open, flexible, demand driven, collaborative information and communication technology based form of education. This form of education is characterised by an integrated, modular learning and support environment that supports synchronous and asynchronous interaction. Because of the modularity, course materials can be easily upgraded and updated as well as personalised to a certain degree (i.e., adaptable to varied and changing individual user needs, as well as diverse contexts). Finally, it is reusable and easily integrated with other systems. The five key concepts underlying this paradigm shift are:

- competency-based education;
- continuous assessment and evaluation;
- co-operative and collaborative learning;
- flexible, personalised learning materials;
- integrated learning communities with a balance between ICT and bricks and walls.

Catalysts

The forces behind this transformation (not innovation) look like this:



Education is in transition from a dissociated knowledge/insight/application-based cognitive paradigm towards an integrated contexts/skills/competency-based constructivist paradigm. This is compounded or strengthened by a simultaneous transition from a supply-oriented approach to education towards a demand-oriented approach to learning. This is a transition from skills delivered towards competencies needed, from (under) graduate and institutional education towards post graduate and life long learning where learning and working are linked and from standard packages towards increasingly personalised materials which are adaptable to personal needs.

Society is in transition towards individualisation. People want and need just-in-time and just-for-me life long learning. To stay competitive they have to constantly improve and expand their competencies. In their day to day lives they are bombarded by technological developments in ICT and they expect this to carry over into the provision of new learning facilities: Internet, electronic learning environments, and e-learning. Finally, there is an emerging need/demand for better equipped personnel, enabled to work together with experts from other disciplines and to manage their individual learning needs.

Thirdly there is an economic drive towards cost effectiveness. The development of (electronic) learning materials is quite expensive, so reusability and co-operation in the sense of co-makership and co-development are of increasing importance. This is compounded by a decrease in funding provided by the Dutch Minister of Education for the traditional OUNL-tasks (second chance education) and an increase of budgets for the innovation of higher education, to be supported by the OUNL.

Finally there is a market force behind this transition. There is increasing competition within the field of higher education. Corporate universities, traditional universities spreading their wings into the area of continuing, lifelong education and new-economy businesses have all become players in the traditional DE-market.

Institutionalising Change

Institutionalising this change is not an easy process. To achieve this, the OUNL is, at this moment, busy on four different fronts in this process. These are:

- Developing the educational paradigm: Distance education at the Open University of the Netherlands is evolving into its third generation. Theoretical developments, social demands and the integration of new technologies lead to a paradigm shift towards competence based learning, authentic assessment and collaborative learning.
- Instituting the necessary hard and soft infrastructure: The university first fundamentally renewed its hard infrastructure starting at the glass fibre based campus network, upgrading intranet and extranet bandwidth and at this stage ending with the development of tools supporting the educational paradigm shift. The OUNL then began a second renewal process, but this time to the ‘soft’ infrastructure, namely the business processes. The university has started to change production processes and is investigating possibilities to tune all of the institutional structures.
- Professionalising the staff: The university is aware that the introduction of this new educational paradigm and new tools to support the creation of learning environments according to new insights demand a carefully undertaken process of professionalisation of its staff on all levels (educational, technical, psychological, et cetera). A programme for staff development is emerging.
- Co-production as a way of thinking and working: Moving away from the traditional production process, co-production has to be redefined. New demands such as the need for rapid development of materials due to quick obsolescence of knowledge and skills, quick response to market demands due to societal and economic factors, re-use of existing materials for different educational or training settings, and delivery to multiple – possibly not yet defined - platforms (WWW, print, CD-ROM, and so forth). The relationships with partners in co-production have to be reconsidered. The consortium "The Digital University", in which the OUNL participates together with three other universities and seven polytechnical colleges for higher vocational education, is a very prominent outcome of this change.

State of the Transformation

The shift towards a competency-based educational paradigm [4] has been made in the sense that a few pilots have been run and that the first larger scale projects have been completed where electronic content was produced according to the new paradigm. Until now only a modest number of courses have been developed in which competencies, continuous assessment and collaborative learning are fully implemented. These projects are supported by a research program in which scenarios and concepts are analysed with respect to the assessment of competences, the effectiveness of collaborative learning and the design of competency-based courses. The projects are also supported by a development program in which an electronic support environment has been built that enables synchronous and asynchronous interaction, that stores instructional materials in a reusable manner and that can easily be integrated with other systems.

An infrastructure has been implemented that enables development and delivery of competency-based materials. This involves an electronic learning environment called Edubox®, which among other things provides a personal electronic workspace on the Internet via the OUNL Studienet portal used by more than 10.000 students. It also involves an Educational Modelling Language (EML) to support large scale media-neutral coding and modelling of instructional materials. Besides this, the course production processes are under reconstruction in order to arrive at a reduction of the production time and more efficient business processes which had to be redesigned. A switch has still to be made from a discipline-like organisation to an organisation in which multidisciplinarity is dominant. Therefore, all disciplines will be brought together within one organisational unit.

The incorporation of the new paradigm asks for different types of training/professionalisation. On the basis of the first pilot projects, a training program in educational modelling in EML has been developed and is being provided to all participating staff members. The same holds true for a training programme in designing competency-based education. Also, a large database with frequently asked questions with respect to competency-based topics has been implemented that can be consulted by project members. Besides this, in projects in which there is a large amount of new content-production the subject matter specialists get on-the-job training and are coached and guided by educational technologists.

Finally, because the development of electronic content is very expensive, co-production of materials is becoming more important. Cooperation with other higher educational institutions that already exist is becoming organised in a more formal way. The OUNL is laying the foundation for a consortium of 11 Dutch higher education institutes that want to cooperate in developing and delivering electronic content both to higher education students and to life-long learners.

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TECHNICAL CONCEPT AND EVALUATION DESIGN OF THE STATE SUBSIDIZED PROJECT [LEVEL-Q]

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Introduction

[Level-Q] is a project which is supported until the end of 2003 within the BMBF (German Fedaral Ministry for Education and Research) program "New Media in Education". This project aims to develop of a system of learning modules for students of various disciplines and faculties in which key learning objectives ('soft skills') can be taught with the help of new media. These modules combine Web Based individual learning with face to face classroom interaction. The overriding focus is to seek modules which support goal oriented study design and career management. Also other areas such as presentation techniques, communication skills, self - presentation and search for practica/volunteer jobs will be offered. The associated universities are Carl von Ossietzky University of Oldenburg, University of Applied Sciences Lüneburg and University of Hamburg.

A prototype will be launched at the beginning of the summer semester 2002 with two independent modules (communication skills and study planning/time management). Both modules of the prototype can be used by students of the aforementioned German universities. The prototypes (communication skills and studyplanning/timemanagement plus three further modules) will be accomplished in spring 2003. After the trial run and the completion of [Level-Q] in 2003 a distribution of the product is aimed for use at various universities and faculties.

Technical Concept

The framework will be created as a learning background which consits of six modules. The purpose of this learning background is to ensure basic oriantation, to create a community of learners and to enable contact between teachers (instructors) and students. This contact will be ensured via Email and an online Chat Forum. Besides community areas the learning background contains areas of administration and a Content Management System (see Seufert, Back & Häusler, 2001). For our special purpose we need an individually assembled learning background which meets the aforementioned conditions.

So we concluded to independently program our product. Therefore we use products, that support the Open Source Concept. Within this context Open Source Products are advantageous because of their accessable code which makes them highly adaptive concerning special wishes and necessities. There are two reasons for the decision for Open Source Products: they are independent of manufacturers and the acquisition is cost-free.The basic technology for the construction of [Level-Q] is PHP 4. PHP 4 supports most of the current databases like Oracle, LDAP, Hyperwave, MySQL (Claußen, 2001). In our case we chose MySQL as database.The interpretation of the source codes directly takes place on the Web Server (Apache), whereas HTML will be sent to clients. [Level-Q] will not be programed within statical sites but it will be generated individually from the database when users request it.

All elements (text, images, videos etc.) of [Level-Q] will be stored free of redundancy within the database. By using a Content Managenment System which has been developed indepenently as well, even without knowledge of HTML editors easily can update or change content of [Level-Q].

An individual editing concept (allocation of rights) will be realized through this Content Managenment System. Furthermore one of its remarkable features is the surface which is easy to handle and requires only a short training period. Data safety is ensured as well: Editors log in with the help of a password protected mask and additionally obtain an identification number (Session-ID) which will be in use during the session.

Evaluation and Resarch Concept

We will stress three aspects with regard to evaluation and research: medium (method and content), success and learners. With respect to the medium, we will concentrate on common evaluation criteria (Holst, 2000), especially acceptance of the WBT. With regard to success we will concentrate on subjective learning outcomes and on objective measures (e.g. knowledge tests). We are planning a comparison between an Online Format (WBT) and an In-Class Format. Data from learners will be obtained concerning sociodemographic variables, personal variables and computer literacy.

We will distinguish between outcome analysis and process - analysis. Concerning outcome analysis we will take three aspects into consideration: successful learning process (subjective and objective learning success), einhanced computer literacy (practical competences) and acceptance of the medium. Concerning Process analysis we regard variables like sociodemographic variables, motivation, personal variables and others as crucial.

Some of the research questions deal with the role of potential predictors for a positive outcome of the WBT, the question wether all modules can be compared with traditional class room trainings or wether attitudes towards the computer change during the learning process. Finally the achievement of a good fit between person, medium and learning success is of interest here.

Methods of Evaluation and Resarch

Students of diverse faculties will be examined. The number of participants varies between 30 and 50 persons per module (total N ca. 150). We will use paper-pencil questionnaires and online questionnaires (Oswald, Carr and Schmidt, 2001; Tuten, 1997). The study uses cross sectional and longitudinal designs as well. Our presumptions will be checked by using common univariate and multivariate statistical methods and interviews to ensure a more qualitative approach. Concerning the backgrounds of problems and possible frustrations (Hara & Kling, 1999) we will use observations (method of 'loud thinking', Freibichler, 2000) to investigate the learning process as precise as possible. We are planning traffic analysis to obtain data concerning the number of visits of the web sites by participants during one day.

Time frame

The following illustration shows the schedule for the survey and the planned survey instruments

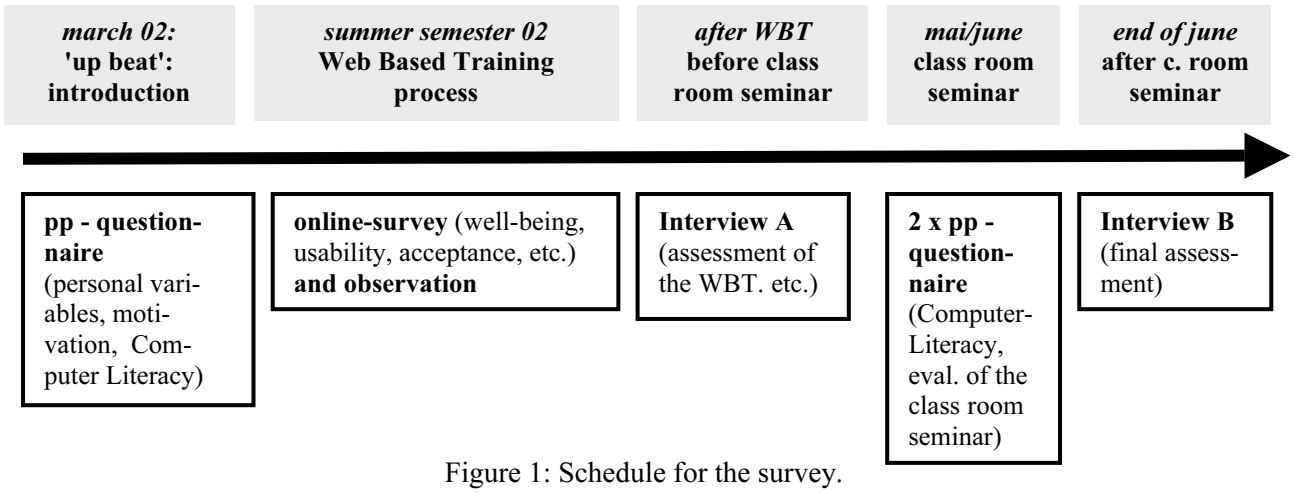

Figure 1: Schedule for the survey.

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POTENTIAL AND PROBLEMS OF SMALL UNIVERSITIES IMPLEMENTING E-LEARNING CONCEPTS - THE CASE STUDY UNIVERSITY OF VECHTA -

Jochen Schiewe, University of Vechta

1. Introduction

The necessity as well as the advantages of the complementary introduction of eLearning components on an university and post graduate level are heavily demanded (e.g., see the Bologna declaration) and generally accepted. In the meantime it is also well known that neither a top-down nor a bottom-up development approach lead to a sustainable implementation so that a stronger influence of the medium level - in this case the university level - is necessary. By presenting the case of the University of Vechta (Germany) we will show the potential as well as typical problems by realizing eLearning concepts for small universities in particular.

The University of Vechta is the smallest university in the State of Lower Saxony, educating approximately 2000 students especially for teacherships, but also in environmental sciences (with an emphasis on geoinformatics) or gerontology. In 1999 an interdisciplinary steering group was established which is responsible for developing eLearning concepts, implementing a basic infrastructure and building internal and external networks. The group is technically assisted by the Computing Center which in total consists of 3 persons.

2. General concept

As already mentioned the University of Vechta follows a centralized concept in order to control the eLearning activities which due to the size of the institution is a very effective way. It is obvious that the activities of the steering group have to be integrated into the entire structural development of the university as well as into the political programs on the various levels.

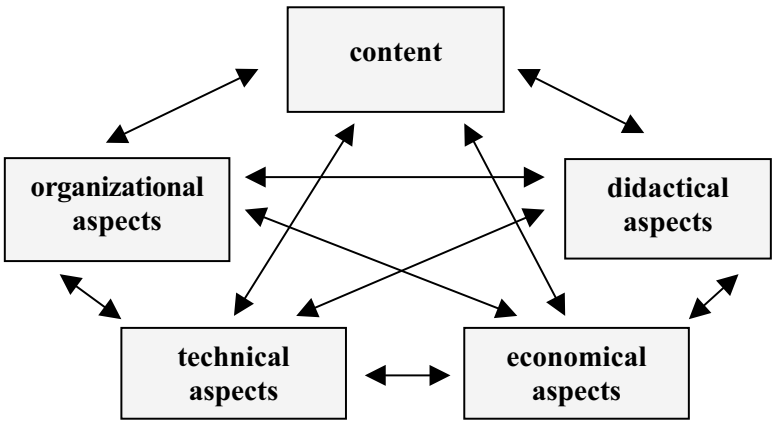

Fig. 1: eLearning Network - describing linked aspects by introducing eLearning components

Key task of the steering group is the implementation of a central infrastructure (i.e., hardware, software, brainware) useable for all disciplines. The corresponding realization has obviously to consider a variety of didactical, organizational, technical and economical factors which together with the actual content are linked into a closed *eLearning network* (see fig. 1). With respect to these aspects the following chapter will describe the present status of the activities in Vechta.

3. Implementation status

3.1. Organizational aspects

The activities of the steering group from an organizational point of view can be divided into the following three parts. Firstly, the general coordination and control of eLearning activities has to be performed, for instance by developing a detailed *concept* or networking to institutions which are important for funding purposes.

Secondly, several actions concerning the *motivation and education* for both lecturers as well as students are organized. Experiences show that especially the goal of increasing the sensibility for the use of new media is rather difficult and with that very important. Core of the education aspect is a series of open lectures (called CyberRingLecture, see also CRV, 2002) which covers a variety of eLearning related topics (like general introduction in common software packages, web design, etc.) in lectures of 60 minutes each.

Finally, the steering group is responsible for building up an appropriate hardware and software *infrastructure* (see also section 3.2) as well as to give recommendations to the university management for the respective administration.

3.2. Technical aspects

Base of the eLearning activities at the University of Vechta were two computer labs both consisting of about 20 workstations with internet access and video projection devices. Since 1999 a *multi-stage extension* of the infrastructure is pursued in order to react quickly to both the user acceptance and the market developments.

With money from the State of Lower Saxony and from the own budget a *multimedia lab* as well as a *multimedia lecture room* have been (nearly) established. The lab consisting of 8 workstations is dedicated to the generation of multimedia based course material (like for WWW or on CD-ROM) and to the use for special purpose courses. The lecture room offers possibilities for multimedia-based presentations, for an audio-visual recording of lectures, and for video conferences.

3.3. eLearning material

Analyzing the status quo the steering group has detected needs for

- eLearning materials that supplement the face-to-face teaching and
- eLearning modules that partially substitute the face-to-face teaching (partially virtual)

Examples for implementations of the first group - mostly coming from the field of geoinformatics - are several digital scripts, some courses that switch between classical lecture and practical exercises using a computer, and some WWW tutorials (see also Schiewe, 2001).

A well-known example for a partially virtual offering is the UNIGIS course (see UNIGIS, 2002). UNIGIS is an international network for distance learning, that in Germany is represented by the University of Vechta (Research Center for Geoinformatics and Remote Sensing) since 2001. Besides some special courses the emphasis is laid upon a 6-month training for unemployed people which is funded by the government and that finishes with an academic degree in geoinformatics.

In a next phase which is under development the emphasis is laid upon *cooperations* with other universities, exchanging electronic course materials as well as entire lectures.

Within the implementation the steering group tries to enforce the respective developers to integrate new *pedagogical approaches* which are necessary in order to guide the users to a self-determined and longlife learning. In particular the focus is laid on project oriented and cooperative approaches. Due to the heterogeneous needs of the incorporated disciplines as well as due to the vast amount of offered products, no decision was made yet for implementing an integrating eLearning platform.

4. Outlook

The described eLearning activities at the University of Vechta have already shown both some success and a couple of typical problems.

The *organizational structure* with a centralized steering group is an effective solution for small universities which are not affected by long distances and complicated communication channels. On the other hand, the steering group consists of research scientists of various disciplines that do not work full time on eLearning activities.

The *technical equipment* can be evaluated as at least appropriate with respect to the number of potential users. Nevertheless, the administration capacity of the Computing Center has not been grown in a parallel manner to the advent of new multimedia components so that a sustainable is endangered at the moment.

Because the emphasis of political funding (especially in Lower Saxony) is laid upon technical equipment rather than *application projects* the University of Vechta lacks of money for actual full-time personal developing eLearning materials.

In summary it can be stated that a couple of promising eLearning initiatives have been undertaken at the University of Vechta. Nevertheless we are struggling with general but also typical problems for small universities that endanger the sustainable development of these activities. Hence, enormous efforts are still necessary - on the political, university and personal level.

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NEW MEDIA IN SPORT AND SPORT SCIENCE - THE EUROPEAN PILOT PROJECT "ITES"[1]

Reinhard Daugs and Christoph Igel, Saarland University

Introduction

The integration of new information and communications technologies into tertiary-level education and research is a special challenge for all institutions of higher education throughout Europe. Whether in the traditional fields of activity and responsibility of academic education, in the context of scientific congresses or publications – the conception, realisation and evaluation of innovative internet-based learning environments is gaining cross-border momentum with the effect that in a few years time virtual universities and colleges are likely to be a reality world-wide. Apart from the technological development of specific hardware and software applications, concepts of teaching methods and communication systems based on findings of psychology of learning and proven by information science will be ever more at the centre of interdisciplinary research in this field.

Against this background, the Institute of Sport Science at Saarland University has realised since 1998 the European pilot project "ITES – Information Technologies in European Sport and Sport Science" which will be sponsored by the European Commission until 2003. This interdisciplinary research and development project aims at the integration of innovative information and communications technologies into the traditional university fields of activity and responsibility using topics of sport and sport science in Europe as an example, realises and monitors systematically and evaluates the opportunities and restrictions of implementing interactive and multi-media concepts and their integration in the established forms of scientific seminars ("Web-based Teaching"), scientific congresses ("Web-based Congressing") as well as scientific publications ("Web-based Publishing").

Multi-media and learning programmes in Europe

In 1995, the European Commission arranged for the research project "Multi-media and learning programmes" to be started. This project aimed at assessing the current situation in the field of multi-media learning programmes in Europe and developing an action plan to activate and co-ordinate European research initiatives in this field and make them more efficient. The European Commission comes to the conclusion that (1) European Universities work on non-commercial multimedia learning programmes of high standard but for internal use only. (2) To be able to disseminate course material and share research findings, they increasingly introduce high-speed telecommunications networks, (3) Starting out from the current degree of networking with 24 million computers worldwide and extrapolating the annual development rate of currently 70 per cent, by 2008 – in less than 6 years from now – there will be a complete global network. (4) Particularly in the field of university teaching, one can assume that more than 10 per cent of all university courses will also or exclusively be offered as web-based courses in 2002. The "virtual university" has stopped to be a utopia long since. Its realisation, however, still requires further developing and, in particular, transferring to and testing in the different areas of application.

Online discussion in the field of sport science via Internet: preliminary stages to ITES

Sport science as well has to face this technological challenge and contribute to the development of a virtual university to be established in the future. As a consequence, the Institute of Sport Science at Saarland University held a web-based seminar for third and fourth year students on the issue of "Sport Talent" for the first time in winter term 1997/98. Apart from the dominant content-wise discussion on aspects of sport talent, the seminar aimed at imparting knowledge in the new information and

[1] The project "ITES – Information Technologies in European Sport and Sport Science" is sponsored by the European Commission (Contract 71178-CP-1-1999-1-DE-ODL-ODL, 71178-CP-2-2000-1-DE-MINERVA-ODL)

communications technologies and their significance for different areas of application. Participants could use the functions: real-time transmission of live expert lectures with audio and video data; interactive communication; parallel integration of course and lecture materials (slides, panels, etc.); availability of videos of the expert lectures for asynchronous participation at a later time; usage independent of whereabouts of the participant (transmit and receive alike); user-friendly interface; simple technology for access and usage; low costs and expenses for provider and user.

Despite a short run-up period and short-term announcement, there was surprisingly great interest in the discussion, which reflected in a lively virtual participation. After filtering the logfiles, the number of online requests amounted to 250 participants from five European countries. This clearly shows the great interest in thematic discussions on the issue of sport talent in Europe as well as the available facilities and preparedness to use the new communications technologies.

The European pilot project "Information Technologies in European Sport and Sport Science"[2]

The realisation of the outlined online seminar led to the idea of scrutinising the opportunities of an unrestricted communication and its integration into the field of teaching sport science. These considerations aimed at the development and analysis of a European model concept on the integration of multi-media and interactive information and communications technologies in university teaching. The thematic networks of the European Union EDEN (European Distance Education Network), EGREPA (European Group for Research into Elderly and Physical Activity), ENSSEE (European Network for Sport Science, Education and Employment) and EUCEN (European Universities Continuing Education Network), as well as 19 universities, colleges and sport institutions from 13 European countries have supported this pilot project.

Such an educational conception can be judged exemplary as there have not been any comparable conceptions on the integration of new information and communications technologies into sport and sport science so far, however, the close cooperation with the European Universities Continuing Education Network and the European Distance Education Network, two thematic networks of the EU in the field of education and further education, open and distance learning at European colleges and universities, clearly shows the importance of this project also beyond the borders of sport science.

First considerations on how to realise the project brought to light the large number of linguistic, technological and thematic problems arising in the conception and realisation of the pilot project. Just think of technological compatibility, availability of the necessary infrastructure in communication technologies for all participants Europe-wide or different hardware and software standards. This clearly shows why the technological orientation towards "the weakest link in the chain" is necessary. Furthermore, practical possibilities, lowest technical requirements and low costs must be well considered.

The conception of the pilot project plans four intertwined modules which are realised in different time frames and with different contents: (1) Organisation of a European interdisciplinary expert hearing on the integration of new information and communications technologies into areas of activity and responsibility of teaching and research in sport science ("European Expert Hearing"). (2) Realisation of a European pilot seminar on the issue of "Sport Talent" via the Internet ("Web-based Teaching"). (3) Implementation of the sub-project "Web-based Congressing" in the framework of the international congress "Activity and Aging". (4) Generation of an Electronic Journal on the issue of "Motor Control and Learning" ("Web-based Publishing").

"European Expert Hearing"

There is no doubt that the integration of new information and communications technologies into teaching and research in sport science is an interdisciplinary project. It requires the knowledge of technical conditions of hardware and software applications used, knowledge of teaching and learning

[2] See homepage of the EU project at *http://www.uni-saarland.de/ites*

processes dealt with in the pedagogical psychology, combined with experience in interface design and communication, let alone the knowledge of sport science as the exemplary project content.

Representatives of sport science can only partially contribute their knowledge and experience to solutions in the outlined disciplines. Therefore, the realisation of such a project has to rely on the cooperation with competent partners. This led the Institute of Sport Science at Saarland University to organise a European Expert Hearing, which was held on 10 – 13 November 1999, on the integration of new information and communications technologies into areas of activity and responsibility in the field of teaching and research in sport science.

Content-wise, the Expert Hearing was divided into two phases. In the first phase, the participants presented and discussed models and concepts of the integration of new information and communications technologies and its significance for the sport and sport science in Europe including latest international tendencies and approaches in educational theory and psychology, such as media didactics or learning and behavioural research, as well as latest insights on open and distance learning and adult education. In a second phase, the Expert Hearing presented a first test for the realisation of virtual, internet-based events in university teaching as internationally recognised experts had prepared different aspects on the issue of sport talent as an exemplary topic to be presented and discussed by the present participants as well as via the Internet.

Module "Web-based Teaching"

The subject matter of the sub-project "Web-based Teaching", which has been developed since the beginning of winter term 2000/2001, is to realise a European pilot seminar on the issue of "Sport Talent" structured in six modules. This seminar intends to impart and discuss theoretical models and empirical findings from the field of sport science and sport medicine on the one hand as well as practice-relevant findings from high-peak performance on procedures in talent promotion and selection in the international context on the other.

The exceptional quality of this European seminar, which mainly addresses third and fourth year students, lies in the integration of new media. The implementation of the internet-based author system Art-Web (*http://ites.swi.uni-saarland.de/ites*) facilitates the preparation and follow-up of all seminar classes as well as different ways of communication. Additionally, the integrated audio-visual online discussions with experts from sport science and sport practice offers the possibility of thematic discussions. The pilot seminar is planned to be carried through synchronously or asynchronously at different European universities and colleges as well as sport institutions.

Module "Web-based Congressing"

From 28 - 30 October 1999, the Institute for Sport and Preventive Medicine at the Saarland University, the Saarland State Sports Association and the Institute of Sport Science at the Saarland University jointly organised the international pilot congress "Activity and Aging" in the framework of the sub-project "Web-based Congressing".

Through the inclusion of representatives from sport science, sports medicine as well as their higher and related disciplines, the organisers realised an interdisciplinary debate in the five working groups Movement and Training Science, Pedagogy/Psychology, Sociology, Orthopaedic Sports Medicine and Internal Sports Medicine focusing on questions relating to the aging process in the context of activity, exercise and sport that reached beyond the scope of the scientific disciplines. It was complemented by a political keynote address, two thematic introductory lectures, five main lectures. In addition, scientists, politicians and sports representatives for the European Union presented and discussed practice-oriented models, scientific findings as well as political programmes in an international forum (representatives of the WHO, the International Council for Sport Science and Physical Education, two thematic networks of the European Commission, the German Federal Ministry for Family, Senior Citizens, Women and Youth, the French Ministry for Youth and Sports, and others) as well as in a national forum (representatives of the Federal Institute for Sport Science, the German Sports Association, the German Association for Gerontology and Geriatrics and the German Centre for

Research on Aging). A total of 248 participants from nine countries participated in the international congress “Activity and Aging”.

The main focus of the module “Web-based Congressing” lay in the realisation of a multi-media and interactive “virtual congress participation” with an emphasis on audio-visual applications, facilitating a comprehensive online participation in a scientific event, live and in real time. Additionally, the working groups and panel discussions offered the possibility to participate via live-chat. After the conclusion of the event, the lectures and panel discussions of the congress “Activity and Aging” have been available as a hybrid product, for a CD-ROM has been generated and disseminated parallel to the book of the same name so that the audio-visual applications which are available online can also be used offline.

Module “Web-based Publishing”

The sub-project “Web-based Publishing” aims to demonstrate new possibilities for internet-based publishing. Since the winter term 1999/2000, the sub-project focuses on the elaboration of a technologically founded and at the same time application-oriented concept of the pilot E-Journal “Motor Control and Learning”, the development of a suitable strategy for evaluation and monitoring as well as its integration and sustainable transfer into the Scientific Community.

So far a web-based prototype has been programmed (incl. necessary databases, e-mail-supported distribution method, full text search, interactive feedback strategies, open commentary room, etc.) which covers the communication interests of a Scientific Community in an exemplary way and is an appropriate instrument for “just-in-time” publication. Considering the unsettled legal situation (“author’s perspective”) on the one hand and little acceptance and within the Scientific Community to use the E-Journal (“user’s perspective”) on the other hand, we should be rather conservative in our expectations regarding the international Scientific Community. If we do not succeed in adjusting the formal status of technical scientific E-Journals (e.g. by establishing of review procedures and impact factors on the one hand or by achieving the recognition of publications in E-Journals in formal qualification procedures on the other hand) to the status of traditional (international) Journals of the print medium, then the existing possibilities of multi-media and interactive communication offered by the new information technologies will be wasted and at best be of little, probably of no use for the strategic development of technical scientific communication and publication.

Conclusion

Web-based applications are making dynamic inroads into university fields of activity, particularly in the areas of teaching and research, congressing and publishing. Cross-border, virtual universities are likely to be a global reality just a few years from now. All scientific disciplines in the tertiary sector throughout Europe must adapt to and participate in this development. This is the only way to make specific technical use of this development and become aware of possible risks early on.

In the future, the further development of scientific disciplines will partly depend on the participation, design and use of new information and communications technologies. Sport Science, with its many links to almost all social spheres of sport and its organisations, has to take up this challenge. The virtual pilot seminar on the issue of “Sport Talent” at the Institute of Sport Science at the Saarland University, and particularly the audio-visual online discussions realised therein, has been a modest, exemplary contribution.

The thus developed idea for a European project on the issue of “Information Technologies in European Sport and Sport Science” focusing on “Web-based Teaching”, “Web-based Congressing” and “Web-based Publishing” seems to be ideally positioned to integrate sport and sport science into this communications technology development within an international context in a model and exemplary way.

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E-LEARNING FOR ECONOMIC DEVELOPMENT

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Summary

The objective of this paper is twofold. Firstly, we want to draw the attention of educational institutions, academics, publishing companies, and government authorities to the potential that e-learning offers for fostering education in transition and developing countries - and ultimately - for fostering economic development and sustainable growth. We briefly survey the trends and driving forces of the growth of the private education sector and the current stage of e-learning firms in developing countries. Secondly, we want to win partners that join us in our efforts to deliver continuing and post-secondary education to transition and developing countries.

Introduction

While many segments of the Internet economy are struggling with the severe downturn of the industry, the various e-learning initiatives targeted at developing countries are experiencing accelerating support from various institutions. Most notably is the commitment of the World Bank and the Australian government. The magazine "University Business" (universitybusiness.com) reported in its September 2001 issue that both institutions formed a partnership that will bring distance education via state-of-the-art technology to developing countries. The two institutions will spend US$1.5 billion to promote education in developing countries. The initiative will cover the entire range from training of primary-school teachers to advanced courses for policy makers. The World Bank devotes US$1.3 billion over five years and AusAid contributes US$200 million to the new program.

At the same time, various government institutions are being formed that support the efforts of education providers. For example, the German government recently founded GATE-Germany (Gate to Academic Training and Education), which is a partnership between the German foreign exchange service (DAAD) and the German Rectors Conference (HRK). GATE-Germany's objectives are: (a) to assist universities in their marketing efforts when recruiting talented students from abroad and (b) to help post-secondary institutions that intend to found a campus abroad. On a global scale, the World Bank's educational consultancy arm EdInvest attempts to facilitate education entrepreneurship and international investment in developing countries.

Driving Forces of E-learning in Developing Countries

Apart from the many advantages that e-learning offers for transition and developing countries in delivering education, there are several important driving forces that will foster the growth of these emerging e-learning markets over the next decade. These demand driven factors can be briefly summarized as follows:

1. In developing countries, there is a large gap in incomes that induces many of the highly qualified teachers to migrate to OECD countries. As a result of this, transition and developing countries continue to experience what has been called “brain drain.” E-learning could counteract these tendencies and give these countries a fertile and “warm brain rain.”
2. Regional income disparities continue to be a source of concern for policy makers. While it is true that regional differences are reflected in internet connectivity, it is also true that once a class room is wired, its students have equal access to the very same educational resources that are available on the Internet as those who live in the most privileged areas of the world.

3. Corporations continue to internationalize their business operations and their market scope. They have to deliver training to their employees and sales force in many different countries. These international cooperations need employees with certified qualifications from high quality education providers. In many developing countries, such education providers are not available locally.
4. IT prices continue to fall worldwide and make it affordable for larger shares of the world population to become wired. For example, the U.S. producer price index for computers declined in 1999 by nearly 20%. Since 1997 that decrease was no less than 20% in each of these years. The other major cost component of internet access are the rates for telecommunication. Here too, prices come down all around the world. Deregulation and competition make this happen. For example, until 1999 it cost around €300 in the Philippines to establish a land line telephone connection. Today, it only costs €50.

The Potential For E-learning in Developing Countries

At the risk of sounding pathetic, for the first time in history, e-learning makes international trade in educational services possible. Trade in education is already a reality. For example, students participating in the e-learning courses at the University of California Extension are from foreign countries like, for instance, Russia, Mexico, Japan, and Canada, and at the online campus of the University of Phoenix, there are students from 21 different countries enrolled.

E-learning eliminates trade barriers to export education abroad. Before the emergence of e-learning, students had to leave their home country if they were either looking for a highly specialized degree program that was not available in their home countries, or if they were born in less developed countries. In both cases, they typically had to pay much higher costs of living during their studies than at home. To get an idea of the real market potential for high quality post-secondary education outside of the U.S.A. and the willingness to pay for education of students abroad, it is instructive to take a look at the foreign student population in the U.S.A. Table 1 shows where foreign students in the U.S.A. come from.

Table 1: The Fifteen Largest Foreign Student Groups in the U.S.A.

Place of Origin	1998/99	1999/00	% Change	Place of Origin	1998/99	1999/00	% Change
China	51,001	54,466	6.8	Mexico	9,641	10,607	10.0
Japan	46,406	46,872	1.0	Turkey	9,377	10,100	7.7
India	37,482	42,337	13.0	Germany	9,568	9,800	2.4
Korea, Rep. of	39,199	41,191	5.1	Malaysia	11,557	9,074	-21.5
Taiwan	31,043	29,234	-5.8	Brazil	8,052	8,600	6.8
Canada	22,746	23,544	3.5	UK	7,765	7,990	2.9
Indonesia	12,142	11,300	-6.9	Hong Kong	8,735	7,545	-13.6
Thailand	12,489	10,983	-12.1	WORLD TOTAL	490,933	514,723	4.8

Source: Opendoors on the Web [http://www.opendoorsweb.org/datadownload/download9899.htm]

Nine out of the fifteen countries with the largest foreign student population come from Asia. And these countries account for almost half of the foreign student population in the U.S.A. China alone sends more students to the U.S.A. than all of the Western European countries combined. For educational markets, it is the number of people that matters for the potential of investment opportunities. Here, Asia is by a far margin the number one foreign market for education.

E-learning Firms in Asia

Not only in North America and Europe are firms entering the new e-learning market. In Asia, too, there is a growing number of firms and institutions that emerge in the e-learning industry. According to the eAsia Report, which is a study done by the New York City research firm eMarketer, Asia can be expected to have 61 million internet users by 2002. This will be 22 percent of the world's total. The internet community in China, for example, grew to 6.7 million people by the end of 2000 (up from 890,000 users in 1998). The research firm IDP Education Australia predicts that the number of university students in Asia will reach 45 million by 2010 and rise to 87 million by 2025. NextEd Ltd., which is an internet start-up in Hong Kong, estimates that the e-learning market in Asia accounts already for US$6 billion and grows at a rate of 25% per year.

The potential for post-secondary education providers in Asia is enormous, but these emerging education markets are difficult to enter. For individual universities, colleges and commercial training institutes in OECD countries it is simply too time consuming to deal with accreditation and regulation issues in emerging market countries. For example, while China is the biggest market for higher education, delivering education in the PRC requires the approvals from at least three ministries – the Ministry of Education, the Ministry of Information, and the Ministry of Foreign Trade and Economic Co-Operation.

That is where NextEd steps in. The company lowers the barriers to entry into the Asian emerging markets for educational institutions from OECD countries and at the same time makes high quality education accessible for students in Asia. The company serves more than 2,500 students across Asia with more than a hundred courses and 15 different degree programs. NextEd also makes use of distance learning centers such as local computer schools. According to NextEd's CEO Terry Hilsberg, these distance learning centers, which often just look like small computer shops with several PCs and internet connection, are particularly advantageous for students living in remote areas. Students can access university education even if they live far away from the next school. Thompson recently invested US$9 million in UNext.

Company Profiles and Alliances From the Asian E-learning Market

Some brief company snapshots also show the growth of e-learning in Asia:

- OnlineLearning.net and the Singapore-based 1to80.com launched recently an online knowledge portal. OnlineLearning.net distributes online courses which are developed by, for example, UCLA Extension and other U.S. universities, and 1to80.com is a subsidiary of the PC maker Acer (Singapore). The company 1to80.com also plans to offer courses in other languages but English.
- In September 2000, Informatics Computer Institute (Philippines) launched an e-learning vertical portal called PurpleTrain.com, which offers e-learning certificate, diploma and degree programs in information technology and business. The school is affiliated with 14 universities worldwide.
- Loxley, which is an ISP in Thailand, distributes web-based training content produced by KnowledgeWindow.com (Princeton, New Jersey). Its focus is on web-based English language training for government agencies and businesses in Asia.
- Karrox Technologies Ltd. [http://www.karrox.com/], is an e-learning IT training firm in India that focuses on the corporate market in India. However, they also offer an online MBA. This degree program and other courses provided by Karrox can be taken at local computer education centers that are franchise partners of Karrox.
- The CIE-College (Philippines) [http://www.cie.edu/college.htm] offers undergraduate degree programs leading towards a Bachelor of Arts in Business and a Bachelor of Science in Computer Studies. Students are top high school graduates from Cebu and other provinces and islands including Luzon and Mindanao. They can study on campus or online. CIE-College also uses course materials developed by the Open University, U.K..

These snapshots of emerging e-learning firms, alliances and institutions show that e-learning is becoming a reality in the developing countries of Asia. While it is certainly true that government regulation, relatively low bandwidth and high telecommunication prices (as compared with the U.S.A.) are important impediments for more rapid growth of the new education economy in developing countries, it is also true that one can cite many cases where private education firms in these countries have been operating successfully for years.

Advantages of E-learning For Delivering Education to Developing Countries

Now, what are the advantages of e-learning for delivering education to transition and developing countries? The list of highly advantageous features that the new learning technologies offer for e-learning applications with transition and developing countries is long. Below we give a short list of some of the typical problems that beset the delivery of education to transition and developing countries and the potential that e-learning offers for solving these problems.

Problem of Delivering Education to Transition and Developing Countries	Problem Solving Potential of E-learning
High diversity of educational backgrounds of learners make face-to-face teaching especially difficult and impede the learning effectiveness.	The hyperlink structure of the internet makes it easy and inexpensive to incorporate free background material and glossaries that help to bring all learners up to the same standard.
High travel costs and seminar fees result in rather infrequent and short courses. Weekend seminars give little time for participants to solve exercises and sample problems, which induce them to apply the newly learnt techniques and concepts. Without such exercises, the new knowledge presented does not become part of participants' active skills.	The learning effectiveness of a hands-on approach is much higher than learning through listening. But a hands-on approach takes time and cannot be taught in weekend seminars and "crash courses." E-learning is ideal for a "learning-by-doing" teaching mode that allows learners to acquire the new knowledge step by step and incorporate it into their daily work.
Especially studying more advanced course material which improves students' cognitive knowledge that facilitates understanding can be quite frustrating without sufficient communication with the instructor. Such frustrations result when students "get stuck" and they severely endanger the learning success.	In e-learning courses, students do no longer "get stuck", they can always quickly ask for help. E-learning allows the frequent and cost effective communication between the learner and instructor. Moreover, e-learning facilitates communication among students as well and, thereby, students can share their learning experiences and problems, which improves their motivation and learning success.
Learners often hesitate in face-to-face seminars to ask "stupid questions." Yet such hesitation hinders the learning effectiveness.	The barriers to ask such questions is much lower using e-mail than in class discussions.
Most potential learners do not know, what they do not know and what is out there that they could and should learn. In the past, education used to be one of the sectors with the lowest market transparency.	A large number of e-learning portals provide unprecedented market transparency of educational offers. Online bookshops and the course syllabi posted on academic web sites make it extremely easy to get an overview of today's knowledge base for any field.
The relatively high costs of textbooks make it difficult for instructors and teachers in transition and developing countries to gain access to state-of-the-art teaching content.	There is an enormous array of high quality teaching resources on the internet that is freely available.
Human capital investment decisions are insufficiently vertically integrated. As a result, highly educated people find no adequate employment opportunities because their potential co-workers lack basic education.	Modularization of course content allows the cost effective provision of continuing education at all levels of the value chain and hierarchy.

This short list already makes clear that e-learning is an extremely promising innovation for fostering economic development. So it should come at no surprise that the World Bank gives high priority to e-learning projects.

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"ONLY HALF WAY THROUGH - BIG COMPANIES IN GERMANY ENTERING THE ELEARNING WORLD".

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Current Market Studies: E-Learning not taken as a matter of course in big companies, too

Companies of all branches are discussing intensively the introduction and application of eLearning for in-house further education. Especially big international companies have been making first experiences with net-based training. MMB has carried out several representative studies about the spreading, general circumstances and problems of implementing eLearning within German companies. The most recent study commissioned by KPMG Consulting focused on the use of eLearning in large German companies. The survey shows that in-house training supported by eLearning is offered by less than half of the big companies.

Technology alone does not pave the way to successful eLearning

Up to now the topic eLearning was looked at primarily from a technological perspective. This narrow perspective can be found in the structure of the German eLearning market, too. Content, implementation, and consequences for human resources management are still going short.

Three extensive studies carried out by MMB institute in recent years give a comprehensive picture of the eLearning market in Germany and the crucial problems with introducing computer assisted learning methods in companies of any kind and any size.

A survey of small and medium sized enterprises (SME), carried out by MMB Insitute in 1999, showed i.a. that most of the smaller companies do not have sufficient information about the eLearning market. On principle most of these companies have all necessary assumptions to make use of computer based learning devices. Technical infrastructure is sufficient, computers are mostly interlined, and the implementation costs for eLearning are no crucial obstacle, too. What is lacking most is a transparent market, objective criteria of quality, and - last but not least – eLearning content, which is aimed at the special needs of SME.

Not only SME and self employed professionals look rather sceptical at computer based training, this is true too for the majority of big companies, among them several global players, as the recent MMB study shows. For this representative survey, which was commissioned by KPMG Consulting, HR experts in more than 800 companies with more than 1.000 employees have been interviewed.

The study asserts, that all education and training efforts in big companies are determined by a traditional approach. In-house or external classroom training still predominates in most of the cases. Computer assisted training is offered in less than half of the large companies.

In general, eLearning content is more or less limited to general IT skills, languages, and commercial (business) topics. In most of the cases eLearning is not addressed at the whole staff of a company, but at selected departments or groups. All in all only 20 percent of the employees are reached by eLearning offers, and of them only every second makes use of it.

Only 28 percent of the companies, which already use computer based training, have installed integrated training concepts (“blended learning”). The “additional” concept predominates – with eLearning lessons added to – rather than integrated into – traditional classroom training.

About 90 percent of the companies report about technical problems during the first phase of implementation of eLearning. Besides technical problems, many of the large companies had to deal

with organisational problems of eLearning (during work time, at the work place etc.). Help from outside – from specialised consultants – would be most welcome, as we learned.

When asked about the results of eLearning – and first of all: about the contentment of the employees with this new form of training and education, about 75 percent of the companies report high acceptance rates among their employees. First of all the flexibility of computer based training environments and the chance of "learning on demand" are appreciated by employees and human resources managers as well. "Better learning" had not been expected, but rather "faster and on-time" learning.

The costs for computer based training make up about 10 to 12.5 percent of the total training budget. But as the HR experts did forecast in our survey, the eLearning share will exceed to about 25 percent of the training budget within the next 3 years (until 2004). This very optimistic prognosis shows, that – despite all problems – human resources managers in large German companies, which are already applying eLearning, are very much in favour of this new way of in-house training.

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OUR E-LEARNING JOURNEY: A CASE STUDY

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Introduction

The process of building a new learning architecture is about the design, sequencing and integrating of all electronic and nonelectronic components of learning to deliver the optimum improvement in competence and performance of students and teachers. To reach that goal, we have to improve or modify the critical internal operations at the university relating to three different but interconnected groups: teachers, university managers and students. A substantial part of this process could be characterised as an effort leading from the classroom teaching to e-learning. In the contribution we will present our steps to e-learning.

Our Dilemmas

Before we started with on-line teaching, we analyzed relevant strengths and weaknesses of our University.

Strengths:

- connection to TEN-155 and all our University buildings connected via fiber optics
- the University computer net based on WindowsNT
- a strong technical support (a group of young enthusiastic people)
- a web-based student records keeping system
- financial support within TEMPUS project S-JEP 12339-97: Multimedia and Distance Learning for Teachers
- two members of senior management passed LOLA (learning about open learning) course which was developed and delivered to promote open and distance learning in Central Europe.
- some teachers having some experience with multimedia authoring systems

Weaknesses:

- no virtual learning environment
- no developmental server with multimedia authoring system
- not enough staff with experience with on-line delivery and with multimedia authoring systems
- all teachers had to teach a lot of hours and they had to do research work – no capacity available for training in distance teaching techniques and to prepare the distance learning materials

At the beginning of our way to on-line teaching, we tried to remove our weaknesses. The main dilemma was connected with the selection of the virtual learning environment and the multimedia authoring system. There is a lot of software on the market, so the choice was quite difficult. We decided to install LOTUS Learning Space (to be honest, important reason was, that this software was donated to the University as a special offer from the company) and Macromedia Director. Before introducing it to the course delivery, the related staff had to be trained – in this point was helpful our international co-operation within TEMPUS project (Finlay et al 2000) and the distance course "Designing and teaching on-line courses" offered by University of Massachusetts, which was delivered on-line and was developed in Learning Space. Another dilemma was connected with the distance teaching methodology – and the question was: Combine Web-based delivery with face to face sessions? We analysed the possible models (Turčáni 2001, Rosenberg 2001) and decided to implement a model based on mixed mode and task-based learning.

Community and collaboration in e-learning

The biggest problem in developing e-learning in our country is lack of suitable learning objects in Czech (or Slovak) language. Learning objects (according to IEEE's Learning Objects Metadata) are defined as any entity, digital or non digital which can be used, re-used or referenced during technology-supported learning. The main resources of learning objects started to be developed at the universities, mainly within various projects. The problem is that the learning objects, which have been created at the universities are not available and are not shared with the others. The main reasons for this „isolation" of learning objects often is a lack of information on one side and the legal problems with copyrights on the other side. Therefore, the University of Hradec Kralove in cooperation with National Centre of Distance Education and EUNIS CZ association decided to organise a national competition of distance courses called "e-learning"

The main aim of the competition is

- to stimulate cooperation among Czech (and Slovak) universities,
- to motivate development and deployment of on-line courses,
- to evaluate quality of on-line courses materials,
- to demonstrate on-line teaching methodology, problems and achievements.

The evaluation procedure has two-steps:

- In the first step the jury grades course materials (1 to 9, the more the better) according to the criteria given in the table below.
- In the second step a workshop is organised where the authors of the best courses demonstrate their products to the jury and to all interested people.

A broad discussion is supposed and stimulated at the workshop. The demos of the awarded courses are published at the web site http://b17-06.uhk.cz/soutez/ as examples of the best practices. We believe that this will motivate other people to participate in this challenging development.

Criteria used in the competition:

The basic features (35% of all points)	Weight
Mesurable and testable course objectives	3
Intuitiveness of course control	2
The overall design of the course	1
Course graphics	1
Usage of multimedia	1
Lucidity	2
Resourcefulness	1
Response time of the system	2
Quality of supplementary materials	1
Motivation of the students (27% of all points)	
Discussion groups and whiteboard	3
Workgroups	3
Practical examples	5
Planning and organising of learning process (8%)	
Support with calendar, vocabulary, index, search possibilities	3
Feedback (30%)	
Monitoring of student's progress	2
Autotests	4
Tests, assessments, assignments, exams	6

Weal and Woe on our way to e-learning

On initial stages after 1990 we used shared directories on network hard discs where single study documents were placed. Nowadays the full use of computers is supported by many other products – e.g. information system (where students can find syllabuses, can register for courses and for exams, Sylabus Plus (knowledge-based timetabling system) etc. In the course of time the shared directories did not satisfy more challenging needs and that was why teaching supporting web pages became the following stage towards e-learning. Nowadays personal webs are used by about one fourth of all teachers at our faculty. And for the moment being professional virtual learning environments as WebCT or Learning Space are used. The first fully distance on-line course was prepared in 1998 within the TEMPUS project MUDILT. Thanks to this project first six-member team was established and took an active part in dealing with problems of on-line courses. These days the number of members was extended and within further education we offer two on-line courses to the public:

"The Internet in Education" and "Modern presentation and Education". Some more are in preparation: "ECDL", "Creating videos", "Macromedia Flash". Participants of these courses work mainly as basic and secondary school teachers in the whole Czech Republic. So far more than 100 people interested in new knowledge have taken part in four courses. The courses usually last 10-12 weeks (it means 60-100 hours of self-study). Study materials are distributed on CD-ROMs placed directly on the web or prepared in the form of manuals. During the course students have to prove their knowledge by completing several assessments and each course is supplemented by three optional meetings. To pass the course does not mean "to attend lessons" but "do homework" in a practical way. Although the distance courses efficiency is usually lower than in classical present form, in our courses, which are aimed at teachers, the average successfulness was 76%.

Last year we started working hard to transform several subjects into the on-line form for our part-time students. In the winter term 2001 there were pilot courses Advanced Database Systems and Networks. We used our experience with the courses developed before but there were several important changes as well. Speaking about courses, which were prepared within further education, they were created by quite a large team. The content of the course was divided into several modules, each of which had its own warrantor who was both the author of study materials and the tutor. The teamwork was coordinated by a manager. A technician responsible for solving IT problems was a member of the team as well. As our faculty does not belong to the biggest ones, each subject teacher usually does both activities: reads lectures and leads seminars (sometimes there are 2-3 more teachers for the seminars). Speaking of on-line subjects the number of team members decreased considerably. Now the team consists of the author, tutor and the on-line teaching expert. Then there are the opponents and tutors.

There is also another difference: for more than two years we used Lotus Learning Space in e-learning courses for further education. In 2001 when we started e-learning courses for university students, we changed to WebCT. Although both environments are similar in basic functions, from the point of view of the course there are substantial differences. Our course Advanced Database Systems is the winner of the above mentioned e-learning competition. It is objected to the third-year students of Information management. We aimed at using as many possibilities as the environment can offer and that was why the study material preparation was rather demanding. But the newly developed materials fulfil the requirements set on content, lucidity, graphics, pre-defined icons facilitating orientation and making students active in self-study.

Apart from the html pages with texts, it was necessary to prepare the course schedule, strictly define graduating conditions and prepare running evaluation of students´ successfulness. Students can use self-tests (Picture No1).

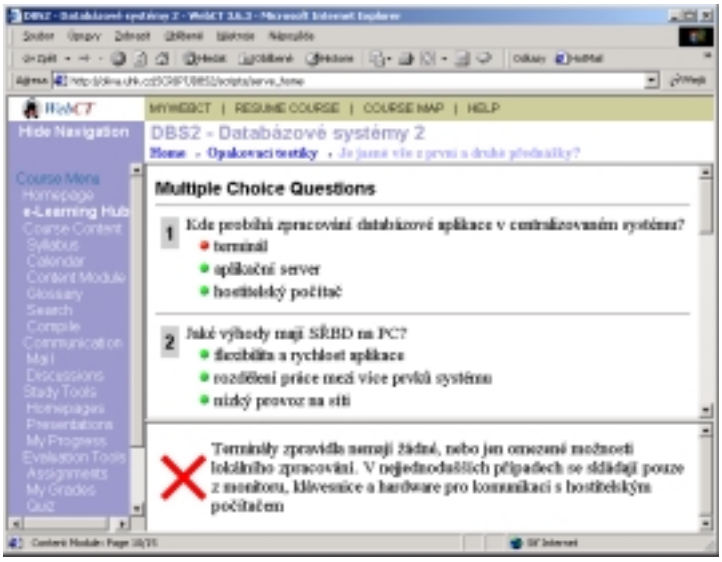

Figure 1: Example of a self test

They proved their progress by fulfilling eight assessments. The assignment and validity were strictly defined. For communication with students only asynchronous mail and discussion were used because synchronous tools did not cover the original intention, i.e. study at any time. The use of detached mailboxes appointed for this course seems useless when each student or teacher has had the mailbox. The separation of public address from the course one appears to be very useful, especially for teachers. It enables to detach private mails from the course ones, shows their chronological order and makes the situation clearer. The teacher had to answer 144 mails in this course.

Discussions were a useful contribution as well because it was an easy way how to public important information or answer questions for all students. WebCT supported the subject Advanced Database systems and its project parts very well. Students work in teams of 3-5 members and develop a real database application. The virtual learning environment enables both team and class discussions.

Results in the e-learning competition and students satisfied with this way of teaching prove the successful implementation. That was why we decided to prepare at least five more subjects in the on-line form. To bring the plan to life, we started to organise seminars about distance learning methodology and tools (WebCT) and ECDL courses to increase computer literacy of teachers. We also have in mind that the technical support for all new tools might be a critical part. As our pilot distance courses proved when something does not functioning properly, the teachers and students feel very frustrating

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ON THE WAY TO THE VIRTUAL LEARNING ENVIRONMENT

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Abstract

This contribution represents an approach to the development of a virtual learning environment at the Faculty of Management and Economics of Tomas Bata University in Zlin, within the framework of a complex development programme of the faculty called "DIGITALISATION". The partial goals, the final objective, the original and current states, the individual progress steps, the time schedule and the responsibilities of the faculty staff and departments are all described herein.

The Faculty of Management and Economics has been pursuing this issue for about two years now. Views on support provided through information technology, especially the Internet, for teaching and learning, have been developing and changing step by step from e-textbooks and voiced over presentations through to complex multimedia learning materials on CD-ROMs for CBL (Computer-Based Learning), and right up to the Virtual Learning Environment developed within the framework of an LMS (Learning Management System) and accessible via the Internet. A project team has been working on the testing and selection of suitable LMS. Faculty teaching staff will be fully responsible for the content and didactical standards of the content of the courses, partially responsible for all technological processing and its inclusion into the LMS and fully responsible for the execution of distance or combined learning studies.

1. Introduction

At the beginning of 2000, it was decide to embark on a project entitled "DIGITALISATION", at the Faculty of Management and Economics in Zlin. The programme became the cornerstone of the IT/IS strategies of the faculty. The pivotal project was the creation of the faculty-wide, and respectively, university-wide Intranet, which would ensure the supporting of communications between all levels and parties of the institutions involved (i.e. the teaching staff, students, institutes, and departments or other such bodies) on a qualitatively higher level.

A sub-aspect of the project within the framework of the DIGITALISATION programme, was the area of self-tuition and studies is the creation of a Virtual Learning Environment with a wide spread support for all forms of studies, but above all of the Distance (Learning) or Combined Studies programmes and Life-long Learning. Support of such educational processes will rest upon assuring access through the medium of the Internetu to basic information about the studies programme(s) and the individual courses on offer; on the accessibility of study materials in the form of study texts, presentations, or even multi-media presentations; the solving of examples; discussions held regarding the issues and problems encountered; tests; in making accessible internet-based informational resources; and the provision of resources (means) enabling communication between directly involved participants of the course, i.e. the students and teachers, and between the students themselves.

2. Virtual Learning Environment

VLE - Virtual Learning Environment, in a wider sense is understood to mean the creation of propitious conditions for studies with limited direct participation of the teacher/tutor on the basis of the exploitation of information technologies; and in a narrower sense, on the basis of exploiting Internet-based technologies.

The introduction and implementation of virtual education is still in its infancy here in the Czech Republic. For the time being, here and there, individual courses within the framework of Re-qualification or Life-long Learning courses have begun to appear on the Internet, and in some cases as a support mechanism for students of Combined Studies programmes. Earnest efforts by Czech universities to come to terms with these new trends in educational technologies, and to exploit them to

their advantage are clearly visible, and can be documented at domestic conferences such as ICTE in Rožnov pod Radhošt, organised by Ostrava University or BELCOM in Prague, organised by the ČVUT (Czech Technical University) in Prague.

The following text will describe the approach adopted by the Faculty of Management and Economics, Tomas Bata University in Zlin, to this issue.

3. The Faculty of Management and Economics Virtual Learning Environment Project

3.1. Project Goals

The aim of the project is to create a Virtual Learning Environment at the Faculty of Management and Economics in Zlin that will progressively provide support to all forms of studies that are offered there. First in line is the Combined form of studies programme, which will – with the support of the virtual learning environment still remain combined, but will fundamentally alter the structure of the tuition of studies through decreasing direct tuition within the school and by strengthening self-studies through the Internet. The learning environment developed for the Combined form of studies may – without substantial change be equally useful for the full-time, daily attendance form of studies, e.g. electronic scripts (teaching texts), the repetition of lectures through audio-assisted presentations; the solving of control examples, questions, tasks and so on. This will be followed by the Life-long Learning programme, commercially motivated distance learning courses designed for the industrial, commercial and entrepreneurial spheres as well as for the general public – for whom the distance form of studies is already envisaged. The last studies programme that will feel the benefit and support of the virtual learning environment is the planned MBA Studies.

3.2. Progressive Steps

What does the creation of virtual learning environments represent? The response to this question is delimited in the individual stages necessary for the realisation of the project.

1. **The theoretical preparation of the project** – the collection of basic information about the given issue, the setting of goals, the analysis of the initial situation, the flagging of progressive steps, and the identification of the key factors for the success of the project. (January 2000-April 2001).
2. **The selection of the appropriate software products** supporting virtual learning environments, (Learning/Course Management Systems)- through analysis of the market for such products, analysis of the faculty's means and needs, and the in-situ testing of "final contender" products. (December 2000- December 2001).
3. **The purchase of the software products and appropriate hardware selected.** (April 2002).
4. **The theoretical preparation of teachers/tutors** in the issues associated with virtual learning environments – the technical and pedagogical specifics of the environment, the creation of e-forms of study texts, presentations, tests and other supporting materials, and their grounding in the individual functions of the environment. (December 2001-April 2002).
5. **The theoretical preparation of teachers/tutors** in the issues associated with the didactics of distance learning - the methodology of the creation of instructional support for distance learning, and the methodology of leading (tutoring) distance-learning courses. (December 2001- April 2002).
6. **The creation of course content** – software non-dependent course building blocks (basic information about the course, the syllabus, study texts, presentations, tasks), and elements dependent upon the software environment (tests).
7. **The "filling out" of the virtual learning environment with course content.** (May 2002-September 2002).
8. **The running of the Pilot Courses** and their evaluation. (October 2002-February 2003)

3.3. The theoretical preparation of the project

The basic orientation in the given problem area was achieved during the initial phases predominantly through consulting foreign, Internet-based resources, proceedings of domestic and foreign conferences, personal discussions and consultations with our European partners, and passive participation in professionally oriented conferences. The aims and goals of the project were formulated concurrently with our increasing learning curve regarding these issues – from the original objective (January-April 2000) of creating off-line support mechanisms for studies, founded on the exploitation of multi-media study materials on CD ROM platforms, we moved on (November/December 2000) to the current aim of creating on-line support mechanisms (without excluding the possibilities offered by off-line additional or "top up" support). We then started to concentrate our interest on the analysis of software environments specifically designed to support virtual learning. Once again, we began with comparison studies of those products available on the Internet and of the technical documentation of each individual product; we sought the observations and experiences of academic institutions with greater hands-on experience in this domain, and of our own eventual experiments and tests of trial versions of the products. We also attempted to map out the actual state of affairs and objectives in the given problem area of other universities in the Czech Republic within the framework of set Bachelor's Degree Dissertational Topics during the academic year of 2000/2001.

The current project, as formulated in this contribution, dates back to April 2001.

3.4. The initial situation and approach to the course content

The fundamental cornerstone of courses in the virtual learning environment will be formed of study texts and presentations. At the present time, about 70% of the courses presented within the framework of the full-time, daily attendance form of studies is covered by study texts prepared by teachers of the faculty. These are published not only in the classical printed format, but also in an e-format as PDF files on CD ROM platforms (for the time being only as an alternative medium). Should these study texts consistently contain overviews, summaries, control questions, solved as well as unsolved examples, tasks and suggestions for further thought, they might well be deemed suitable study materials for courses offered in the virtual environment. Presentations in e-format (exclusively in PPT format) are already used in about 25% of the courses presented. For virtual environment courses, we have thought of adding sound to these PPT presentations through the spoken accompaniment of the lecturer and to thereby induce the sensation of actually being present at the lecture itself. Of course, the basic information about the studies programme and individual courses themselves (annotations, lists of lectures, syllabi, etc) are already available for students of the full-time daily attendance form of studies.

It is expected that with the passage of time, and one hopes with the collaboration of other university-level workplaces, a multi-media thematical library of texts, pictures, video sequences, references, URLs, etc. will be created that are commonly available through educational portals on the Internet. With the assistance of such resources, it will be possible to upgrade and modernise the course content of such e-courses on a regular basis.

3.5. Support for the project and key success factors

The project to create a virtual learning environment was born under the generally well-known existential circumstances of universities in the Czech Republic, characterised especially by a hampering due to chronic lack of financial resources. Despite this, (or perhaps precisely due to this), it is necessary to specify the conditions and key factors for the successful realisation of the project. The project's success depends in part upon the efforts of the project team (i.e. the theoretical preparations, selection of the SW products, the guidance and preparation of the teaching staff, management of the project, etc.), and in part upon the efforts of all the teaching staff in the faculty (i.e. participation in the creation of the course, the creation of the subsidiary courses, the "filling" of the virtual learning environment with the course content, etc). The management of the faculty must support all participants in the project both declaratively (i.e. being anchored in the long-term objectives of the faculty), as well as financially (i.e. the remuneration of the project team and teaching staff for the preparation of the course). Such a clearly formulated and openly declared support from the

faculty management's side, may create the pre-assumptions for the self-identification of all those participants in the afore-mentioned project and its importance and absolute necessity for the future development of the faculty. For the time being, the declarative support is crystal clear, but the realisation of financial support is through seeking alternative ways and means (e.g. grant agencies) to financing within the framework of state contributions (i.e. dotations).

3.6. The selection of the software products

There currently exist a minimum of 40 products within the category of LMS/CMS (upon which our undivided attention is concentrated), and which contain all the requisite characteristics and functions to assure the full support of on-line virtual learning whether in a-synchronomous or synchronomous regimes. The differences are to be found in the simplicity of use for students as well as for those actually charged with creating the courses, in the wealth of document formats used, in their licensing and pricing policies, and so on. It is precisely these characteristics as described that form the main criteria when deciding on the most suitable choice. In order to evaluate them, a great variety of informational resources were consulted including comparison studies, product documentation, DEMO courses conducted within the environment of each individual product, the experiences and expertise of Czech university workplaces, as well as experiences gained through the creation of courses using some of the products on offer.

4. Conclusion

Within the confines of this contribution, it has been our intention to publicise the basic objectives, approaches adopted, and the current state of affairs, including the description of partial goals and results achieved in the overall solution of creating a virtual learning environment at the Faculty of Management and Economics, Tomas Bata University in Zlin.

We are fully aware of the fact that, while we are no longer at the absolute beginning of the journey, we still have a long way to go to get to the goal we have set for ourselves. But set out we have, and we are convinced that it is in the correct direction. Should this prove to be true, we would be delighted to be confronted with more advanced workplaces than ourselves at all levels and at all possible forums devoted to the theme in question, such as are for instance the previously mentioned domestically organised conferences ICTE and BELCOM, or else EDEN's activities in the international domain. Within the framework of a general advance, we are open to being approached to engage in a wide range of collaborative ventures, both within the context of Czech university workplaces, or without – i.e. together with other interested parties on European projects.

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A WEB-BASED ODL SYSTEM IN MOTOR DISABILITY ASSESSMENT

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Introduction

Demographic trends suggest for the next ten years a scenario characterized by a dramatically increasing demand of rehabilitation services, due to the explosive growth of the elderly/disabled incidence and by a dual decrease of the active population. This implies, among many other things, that the number of rehabilitation professionals will diminish. It is therefore imperative to increase effectiveness of rehabilitation, in particular with the purpose of improving and/or extending in time the independence of the elderly persons. This asks for more effective treatments, which can be planned only on the basis of a more effective Disability Assessment, i.e. the evaluation of the functional status of the patient, aimed at both recognizing the present level of disability and forecasting its evolution (prognosis). With respect to motor disorders, the assessment has to be considered as the Functional Evaluation (FE) of Motor Disability. FE can be defined as the process by which the current functional status of the patient is assessed by the clinician. It is aimed at evaluating the loss or reduction of the interesting functions. An emerging character of FE is that it is (or it should be) performed by a multidisciplinary Assessment Team (AT) comprehending physiotherapists, kinesiologists, bioengineers, rehabilitation doctors, rheumatologists, orthopaedic surgeons and, in a near future, possibly, geriatrists. The main limitation of present FE is the lack of a uniform quantitative approach and the need of a scientific approach towards functional assessment aimed at the proper planning of the rehabilitation treatment. There is the need of assessment teams able to operate the relevant tools (clinical tools and equipment) in a uniform manner, independently from the country and/or the region within each country they are working in. It can be foreseen that although the rehabilitation services will be needed everywhere, and probably the relevant equipment will be available everywhere needed, the availability of the proper AT will be restricted only to the large rehabilitation institutions and departments. In other words, it seems realistic to draw a scenario where only part of the Motor Disability Assessment (MDA) laboratories will be served by the proper personnel and the rest will operate under-served. This scenario will require the remote direction by the other, who will supervise the operations locally performed and process the results for their interpretation. It has to be underlined that the proper interpretation of the results of MDA is always matter of an AT, involving high-level skills and competencies. Moreover, the best competence would be needed in the case of under-served laboratories, in order to allow the best interaction with the remote AT. National regulations and laws in European Countries ask for clinician registration and will ask for continuing education for them.

The current situation of the European professionals involved in MDA is rather non-homogeneous both among the different countries and within each region of the same country, according to the individual history of the centre and/or lab they are working at.

The state of the art on the education and training in the sector of MDA and, more generally, in the field of Motor Disability is the following. There is a large number of excellent textbooks, whose limitation is often the single discipline approach, with a few relevant exception (Basmajian, 1996). Scientific and professional associations every year offer a number of courses. The main novelty in the last ten years is that the great majority of such courses involve specialist of the other relevant disciplines. They are appointed for a limited number of lectures aimed at making the audience acquainted with the language characterizing the parent disciplines. However, it is rare to find courses fully embedding the multidisciplinary way of working which is currently followed in high level rehabilitation institutions and asking the students to practice such way of working. Currently available courses on MDA are characterised by the following drawbacks:

- are of limited scope, often covering single arguments only;
- provide polarised education, according to the views of the schools driving the delivery of the material;
- are mainly of residential nature, thus occupying some consecutive working days and implying costs for travel, for accommodation and for attending the course itself.

Furthermore, a country-based educational initiative would have the risk of missing the primary objective of disseminating uniform skills throughout Europe, which is on the contrary important in the interest of the final users of the rehabilitation system, i.e. disabled and elderly.

Therefore, it seems important to prepare specialists in MDA and in particular specialists able to exploit information technology and telematics for enhancing their own efficacy and effectiveness and for improving the rehabilitation system efficiency.

MODASPECTRA (MOtor Disability Assessment SPEcialists' TRAining) was a research and technology development project aimed at providing a Web Based Open and Distance Learning Course for training specialists in Motor Disability Assessment (MDA). The specialists targeted come from a background of physiatry, physical therapy and bioengineering. The aim is to offer to the European professionals involved in Motor Disability Assessment both a complete degree and a number of courses on Clinical Applications of Movement Analysis in a Life Long Learning (LLL) context as a mean for upgrading their skills in the line of good practice dissemination and standardisation.

The MODASPECTRA courses

MODASPECTRA provides common and homogenisation courses as shown in table 1. The common courses extensively discuss movement analysis and clinical measurement. The courses "Instrumented measurement for clinical movement analysis" and "Clinical measurement for clinical movement analysis" belong to the area of "Fundamentals of measurement" and describe state-of-the-art methods and techniques, but also methodological aspects such as their validity and reliability. Because not all existing methods and techniques can be addressed in the courses, a limited but practically relevant set of measurement tools are presented to the students. The selection of the techniques discussed is guided by the requirements that appeared in the user needs analysis (MODASPECTRA, 1999a). Especially the users from a clinical background expressed the view that the courses content should be oriented towards practical application. The course "Clinical applications of clinical movement analysis" presents practical clinically useful examples of the use of the movement analysis and clinical measurement that were introduced in the courses belonging to the area of "Fundamentals of Measurement". The material presented in the above mentioned courses will enable the student to apply the measurement techniques properly for a given clinical problem using the presented protocols. Anyway, the student will not be able to interpret the resulting data. This requires a substantial body of background knowledge that will include knowledge about normal movement patterns, important abnormalities, compensation and adaptation mechanisms, etcetera. These issues are covered by the course "Fundamentals of normal and pathological movement". Finally, the separate course "Telematics for Clinical Movement Analysis" addresses the use of telematics for the rehabilitation process.

Category	Name
Common courses	Telematics for Clinical Movement Analysis Fundamentals of normal and pathological movement Instrumented measurement for clinical movement analysis Clinical measurement for clinical movement analysis Clinical applications of clinical movement analysis
Homogenisation courses for Medical Doctors and Physical Therapists	Basic Biomechanics Fundamentals of measurements and signal processing Basic Informatics
Homogenisation courses for Bioengineers	Functional Anatomical Basis of Motor System Basic Physiology Fundamentals of Pathology and Procedures for Interaction with Patients

Table 1 – Didactic offer of the MODASPECTRA Degree

Homogenisation Courses are meant to provide basic knowledge to professionals having different backgrounds in order to allow them to attend in a homogeneous manner the common courses.

Thus, the degree may be attained through a pathway composed by eight courses: five Common Courses that should be attended by all the students and three out of six Homogenisation Courses which will be selected according to the previous academic career of the learners'.

Organization of the MODASPECTRA System

The pedagogical philosophy followed by MODASPECTRA, with respect to the use and development of its Electronic Learning Environment stays between the "Content + Support Model" and the "Wrap-around Model", as defined in (Mason, 1998).

The pedagogical approach considered three main phases, defined as follows:

- Accretion phase. It consists of the study of the learning material presented in the course.
- Tuning phase. It foresees the homework indicated and the self-assessment of the learned Knowledge.
- Restructuring phase. It is based on asynchronous interactions with the teacher and the other students, by means of the participation to discussion lists open and managed by the teacher/tutor.

These phases correspond to the three phases of Conceptualisation, Construction and Dialogue of the Open University Model.

The indications provided by learning technologies standardisation committees, such as CEN/ISSS/WS LT (2000), have been followed: in this context the content material has been structured in a set of Learning Resources (LR), i.e.: Content Units, Composite Units and Courses. In the LLL perspective, each course has been designed as a self-contained LR.

Another key issue faced by the project has been the re-use of the learning material. If learning content is to be reused between systems, and if systems are to be interoperable, then there is considerable advantage in having indexing methods that conform to presently available open standards. Metadata is information about an object, be it physical or digital. In the case of MODASPECTRA the object is a LR (i.e.: content-unit, composite-unit, and course). The IEEE LTSC Learning Object Metadata proposal for Metadata has been adopted (IEEE-LOM, 1999).

All the learning resources and the relative Metadata constitute the Knowledge Pool (KP) of the MODASPECTRA system. In particular, the content-units are stored in a data repository, while Metadata are stored in a proper database.

The software platform of the project has a three-layer structure consisting in:

- the course delivery environment (actually WebCT) for the provision of the content units to the students, and for managing the student career information, and useful also for the back-office operation;
- the knowledge pool management system (Oracle);
- a middle software layer acting as an interface between the course delivery environment and the knowledge pool.

The middle layer allows performing the following functions:

- automatic management of content units to be stored in the database, and their integration in the student interface
- dynamic creation of links to automatically selected content units. Thus, a student can make queries to the Db on specific topics, and the system allows him to find and/or visualise the proper content units among the whole set of Db contents, i.e. pertaining to all the courses of the MODASPECTRA degree.

The procedures for the system operation refer to:

- editor/author interaction, for the definition of the instructional design and the creation of the learning material;
- editor-in-chief/faculty interaction, for the course validation;
- teacher-tutor/student interaction, for the learning of the course content;
- back-office operation for the administrative and management matters.

Final Remarks

MODASPECTRA was a research and technology development project pertaining to the "Telematics Application Programme - Education and Training" sector of the 4th Framework Program for R&D of the European Union. It has been a joint activity of Department of Electronics and Automatics from the University of Ancona (Italy), the School of Physiotherapy of the University College Dublin (Ireland), the Medical Faculty of the University of Montpellier (France), the Roessingh Research and Development (The Netherlands), the TSR consortium in Italy.

As a first step towards the international recognition of the results of the project, the School of Physiotherapy has received the approval from University College Dublin to offer the course “Clinical Measurement for Clinical Movement Analysis” of the MODASPECTRA educational package as a distance learning certificate course from the coming academic year. The Course has been renamed to “Outcome Assessment in Motor Disability”. Directed mainly at physiotherapists throughout Ireland and Europe the course consists of standardised and validated measures to be used before and after treatment to evaluate the effectiveness of the intervention. It could also be relevant to the practice of other health professionals.

The MODASPECTRA project obtained a successful completion and received a very good appraisal by the international board of evaluators designed by the European Committee. The adopted evaluation approach, although partly based on the current literature (Collis and Pals, 2000), was one of the most appreciated issues. In fact it involved a population of three categories of users: a) end users (i.e. the students), b) institutions having expressed interest on the philosophy of the system, and c) teachers and tutors involved both in the creation and in the delivery of the content. This last choice being aimed to provide a certain relevance to the “academic appraisal” of the student learning.

A strong suggestion in developing a larger scale of exploitation has been issued by the evaluators and gathered by the MODASPECTRA Consortium. This would require the accretion and the enrichment of the educational offer that we are planning to aim to the wider field of rehabilitation in the large. This represents a challenging effort that requires the involvement of new partners interested in designing new formative offer while keeping unaltered the devised Electronic Learning Environment.

More details on the project may be found in (Valenti, 2002). The results of the project and the MODASPECTRA system are available at the URL: http://www.modaspectra.org.

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CASE-BASED REASONING TOOLS EMPLOYED IN MEDICAL DISTANCE EDUCATION

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1. Introduction

Every activity entails decision-making. Decisions are the basic components of scientific, professional and private life, and Medical Reasoning [1] constitutes the essence of Differential Diagnosis, which actually forms the “hard core” of Medical Sciences. Case - Based Reasoning constitutes the typical methodological approach to obtain a diagnostic conclusion, i.e. the comparison of a “data”-set collected from the patient with a similar "reference"-set of data, which represents the "normal" condition and which is defined in a more or less arbitrary manner being based on previous, collective experience. The difference of the sets constitutes the "symptoms"-set, which is intended to lead to the successful diagnosis. An implicit assumption in the above procedure is that a pathogenetic process leads to a "nosos" (disease). This disease is manifested through an alteration of morphological and functional features, which are exhibited as parameters, detected (or expected to be detected) through the clinical information, the in vivo signals, the in vitro values and the medical images obtained during the diagnostic procedure. It is further assumed, that there is a well defined variation range of the above mentioned data, which is empirically known to correspond to a "normal" status of the human individual (*health-state*) and that the data exceeding this variation interval, indicate the appearance of an "abnormal" status of the individual (*disease state*). An additional implicit assumption made is that the detection of an adequately large set of disturbed data *("symptoms"- set*) allows for to conclude that a certain disease is present which is induced by the same pathogenetic factors such as have been observed to result in the same or similar disturbance (*symptoms*) in a "reference" case. These assumptions are not always valid and it is often very difficult or even impossible to satisfy them mainly because of the huge number of parameters influencing the health condition of a certain individual and the criteria by which the elements of the corresponding sets are selected.

However, the diagnostic procedure might be successfully completed because the lack of information is substituted by a "diagnostic feeling", developed by the physician and which is based on the length of his practice and a belief in the uniformity and regularity of phenomena. The step from diagnosis to treatment is based on the expectation that the human body will behave in an identical manner under similar conditions. The above discussion presupposes that there is a certain "property" of some individuals, which can be referred to as "medical expertise". This "property" entails, first, medical information that is organised according to some taxonomic schemata. Second, it contains criteria for the logical evaluation of the inferences made and, third, selection rules which allow the appropriate use of the acquired knowledge. Finally, a fundamental component of medical expertise is that which was referred earlier as "diagnostic feeling". The casuistic approach allows for a flexible approach to diagnosis and emphasises the individual aspects of treatment. Thus, computerised Case-Based reasoning systems in Medicine [3] may provide, under specific conditions, an adequate approximation of the health-state of the patient and they can enable the physician to detect and evaluate the abnormality region in relevant value domains.

Medical Education [4] 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. A major problem in Medical Education 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. 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 balance of the roles of all the key players, including health care researchers and practitioners, health care organizations, and the public. It is the purpose of this paper, to present several developed evidence-based "tools", in order to target specific needs of the participants in the training process, and actively engage them, in order to result in better outcomes.

2. Training in creating a comprehensive psychiatric Patient's History

Medical records [2] usually include: first, clinical information obtained by the case history, and by inspection, palpation, percussion, auscultation etc.; second, signals related to bodily functions which are collected from in vivo diagnostic procedures (ECG, EEG, EMG, etc.); third, data acquired through in vitro diagnostic tests; fourth, images related to the morphology and the functions obtained from medical imaging procedures; fifth, information related to various therapeutic interventions; and, lastly, data which are of administrative and of financial importance such as insurance, costs of medical treatment, cost of hospitalization, etc.

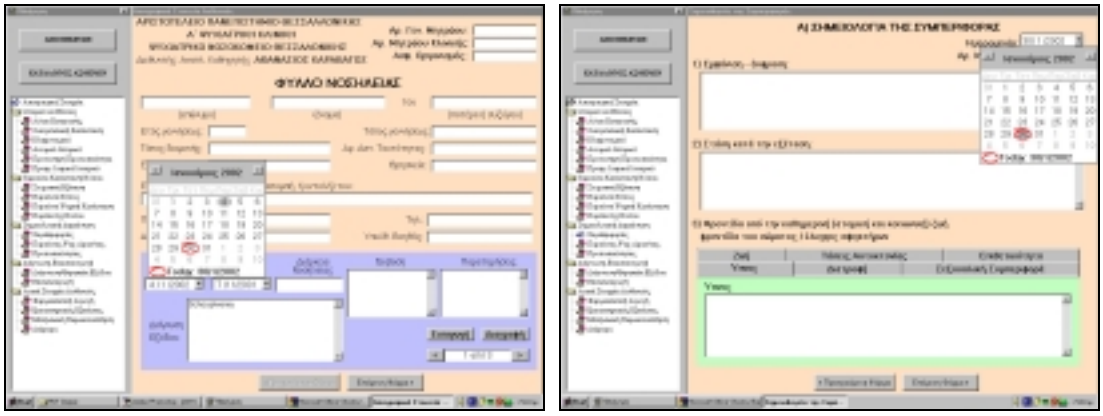

Figure 1: A typical data-input menu of the developed PsychoPro 1.1 Patient's History Capturing Tool.

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. We have developed, based on the traditional questionnaire of the First Psychiatric Clinic of the University of Thessaloniki, Greece, a specific Visual Basic programmed tool that allows for the formation of an extremely detailed patient's history, focussed on, but not exclusively thought for, psychiatric patients. Currently the system is available only in Greek.

Although psychiatric diseases, and especially their mild forms, expressed usually through a variety of psychosomatic symptoms, are dramatically increasing, there are not many mature digital on-line tools to support psychiatric treatment, and most clinicians are not acquainted to their employment. We feel that low-cost training tools, supporting the formation of a flexible and detailed Psychiatric Electronic Patient Record, will contribute to the improvement of the overall quality of patient care, and will also promote the quality of the patient-clinician interaction.

3. Training in Laboratory-Data based Clinical Decision-Making

The first set of developed tools is supporting the implementation of Acute Myocardial Infarction Treatment Guidelines by employing Fuzzy-Logic based software. Only 10-15% of all patients admitted to the Emergency Room with chest pain develops acute myocardial infarction (AMI). The early diagnosis of AMI has to be sensitive, that patients with myocardial infarction can be treated with thrombolytic therapy, and yet so specific, that patients with chest pain, but without underlying myocardial infarction, are not unnecessarily exposed to the risk of such a treatment. The diagnosis of AMI is based on the detection of at least two out of three infarction-specific findings:

- Chest pain >20 min resistant to Nitro derivatives.
- Infarction-specific ECG alteration in at least two leads of the standard 12-lead ECG.
- Increased activity of "cardiac" enzymes.

The system is based on the fact that during an acute myocardial infarction, there is an increase of the concentration of certain, so called cardiac enzymes, which at some point after the onset of the chest pain, reaches a peak and passes on to a normalization phase. The most appropriate enzymes comprise of Aspartate Aminotransferase (AST), Lactate Dehydrogenase (LDH), 2-Hydroxyburate Dehydrogenase (HBDH), Creatine Kinase (CK), Cardiac Troponin I (cTnI), Cardiac Troponin T (cTnT), Glycogen Phosphorylase Isoenzyme BB (GPBB) and the Heart Fatty Acid Binding Protein (H-FABP).

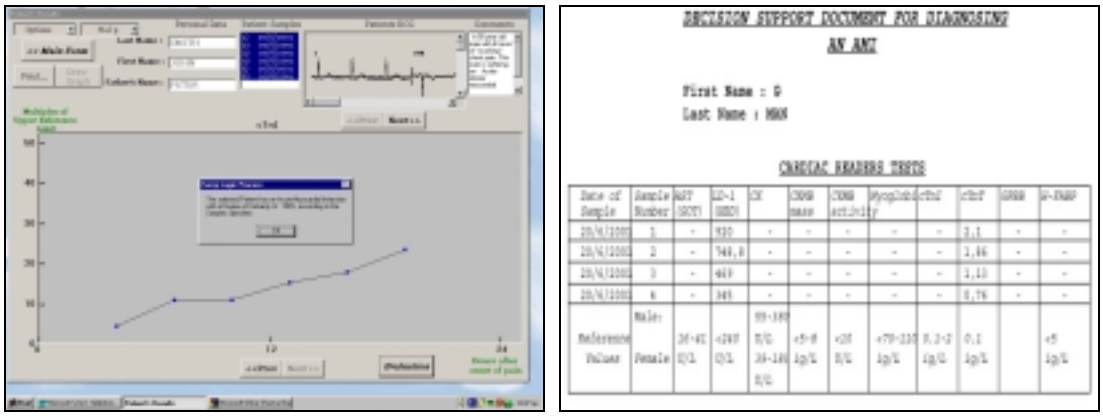

Figure 2: Typical data-input menus of the developed DAA 1.1 and a typical output proposal.

The most relevant features of the above mentioned enzymes, i.e. the Molecular Weight (MW), the reference concentration (Ref.), the Biological Half-life (HL), the Increase time (Incr), the Peak time (Peak) and the Normalization time (N) are displayed in Table 1. By inserting the measured activity values and the corresponding sampling times, of at least one and up to maximum ten specific enzymes, after the onset of the chest pain, the system calculates repetitively AMI risk probabilities for "suspicious" patients in the Observation Ward of an Emergency Department. Reliable reported1, average diagnostic sensitivities, of commercially available parameters, are taken into account, and they are accordingly weighed in the employed algorithm. The degree of certainty P, for the occurrence of an acute myocardial infarction, is calculated, step by step, for each enzyme concentration Ci, exceeding the "normal" interval [Ci min, Ci max] by the following equation, where P_{i1} and P_{i2} enzyme specific constants:

$$P = \begin{cases} K_1 C^i /(Ci\ max + C^i\ min) - P_{i1}, & C^i < C^i\ max \\ K_2 (C^I - C^i\ max)/(C^i max + C^i min) + P_{i2}, & C^i \geq C^i max \end{cases}$$

For each new sample, the relative temporal location of the corresponding value, and the increasing or decreasing trend of the coterminous degree of certainty P, determine the further procedure. Finally, the overall probability is calculated, after consideration of the specificity weighing factors. Temporal evolution graphs of the enzyme activity of every treated patient can be displayed anytime. Other relevant clinical patient data, including also directly recorded or paper-strip scanned ECG waveforms, can be stored in the system's database. On demand, some of these data can be also considered, appropriately weighed, in the overall prediction algorithm. The system is undergoing a continuous, retrospective, case-based, evaluation, for the optimization of the cut-off values.

4. Supporting training in Medical Imaging

Case-Based Digital educational means was developed, concerning certain aspects of current Medical Imaging routine. Educational needs which stem out of the clinical aspects of the imaging routine, were approached, by creating an HTML-based, extended collection of digitized virtual cases, derived by

permission, from conventional medical material, and made kindly available by external cooperating groups. The starting point was the individual patient case and the corresponding films and printouts that have been scanned and stored under gif or jpg format. Directly acquired images from CT, MRI, and Ultrasound equipment, after image format processing (e.g. dicom to gif), were also stored under gif or jpg format. Care has been taken to remove all patient identification data.

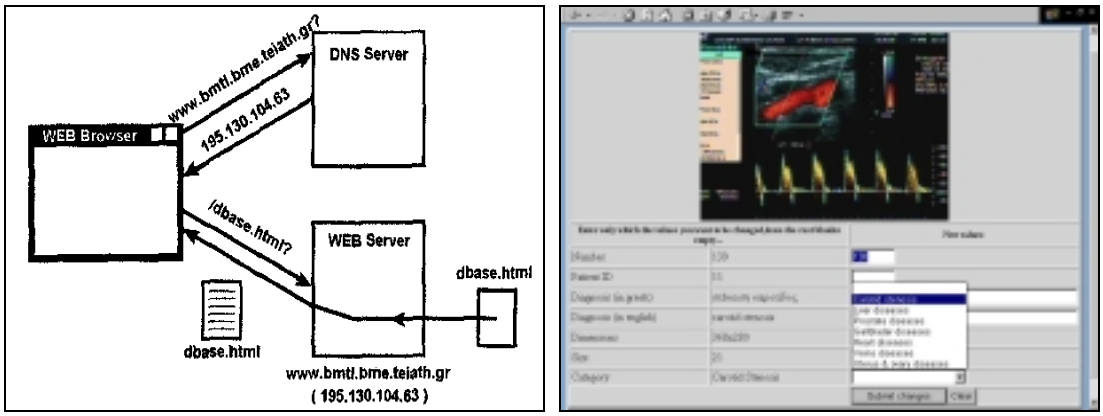

Figure 3: The block-diagram and a typical data-input and image uploading menu of the developed Internet-accessible Based Dynamic Medical Images Library.

The system, in its present status, includes over 2500 interesting cases on CD-ROM, classified and accessible according to examination or imaging method, clinical Specialty and in groups of evaluated images for individual study and the corresponding on-line self-evaluation tests. Further, a Microsoft SQL Server 2000 based Internet-accessible Dynamic Medical Images Library was created, including currently over 200 sample Ultrasound evaluated Images that allows for password protected up- and downloading of Images, as well as, the creation of a temporary limited (10 min) training image collection.

5. Concluding Remarks

The designed educational means is flexible, open to continuous updating, and can assist medical students, and other health-care trainees, to become accustomed to their particular tasks. However, there are also some risks, associated to the extensive, or even worse, the exclusive use of on-line case-based training tools. Although these data, 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 future interpersonal relation between the patient and the physician. Further, the exclusive use of digital means, combined to other traditional ways of distribution of medical data, such as published epidemiological studies and case-studies presentation in conferences and textbooks, intensifies the risk of eliminating the individual characteristics of the specific patient, in favor of the impersonal condition.

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INFORMATION AND COMMUNICATION TECHNOLOGIES AND OPEN AND DISTANCE LEARNING IN EDUCATION: THE EXPERIENCE FROM THREE PROJECTS

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1. Introduction

In this work, three projects are examined and compared. They all refer to the application of Information and Communication Technologies (ICT) and Open and Distant Learning (ODL) techniques in Education. The projects are: YOURA (YOUng Researchers in Action), e-HERMES, and SXEDIA (Educational Network and Web of the Aegean Schools).

Why do we need to present these projects and what do we expect out of this study?

The straightforward answer is that such a work contributes in showing in an integrated way, and more specifically from a theoretical, empirical, experimental and technical aspect, the contemporary trends of research in this field. Apart from that, it may be assumed as bringing evidence in support of one basic hypothesis related to the conformity of the parameters introduced during implementation of such projects. Thus, despite the great variety of the existing applications of ICT and ODL in Education, this work assumes that there are grounds to accept that there is a significant convergence of the main parameters affecting implementation as well as of the main problems met in every case. By specifying these parameters and the relevant problems in an explicit way, there is adequate material in support of the implementation of similar projects in the field. In this sense the work contributes in ensuring quality, minimising omissions and tackling difficulties. Finally such an approach is expected to stress possible requirements for further research, and to provide guidelines useful for planning new projects.

2. Project YOURA

2.1. Description, area of application of the project

"Young Researchers in Action" (YOURA) aimed to develop and apply a pedagogical framework suitable for the introduction ODL techniques in primary education and in parallel to provide in service training to teachers in the field of ODL. YOURA was an ODL project in the field of meteorology.

During implementation of YOURA, the pupils:

Constructed simplified low-cost measuring devices (thermometers, wind speed meters, barometers, rainfall meters etc), applied this apparatus for measurements, compared their measurements with other taken with more sophisticated equipment entered the measurements into the Internet, through a specially designed user interface, the e-com. The e-com had real-time data analysis capabilities, producing pictures and plots that represented the weather situation in the specific area the measurements were taken. Pupils compared the weather situation in the area they live, with the ones of their virtual classmates. This comparison formed the stimuli for a dialogue with the virtual classmates through the various communication channels offered by the e-com (Bulletin Board, video conferencing, electronic magazine named METEO).

The project's implementation started at three schools with a test run. For the project to be tested in a much wider scale, at the final run, more schools, were invited to participate, selected according to socio-economic criteria

2.2. Goal, characteristics of the project

The "YOURA" project was developed across two main parallel aspects:

a. Development and application of a methodology, which helps overcome the specific difficulties, related to the effort of implementation of ODL practices to young school students (such as lingual problems, familiarization with the use of ICT etc). The collaboration of three pedagogical University departments and a European school network aimed to the development of user interfaces based on non-verbal communication, the introduction of students to the successful use of ICT and their introduction to scientific inquiry techniques. Through "YOURA" pupils were gradually introduced to the idea that learning is the result of formulating questions, researching, investigating and finally sharing results.

b. Provision of in service training to educators and students of pedagogical departments based on experience of ODL application in school. Educators of the participating schools as well as students of the participating Universities were provided with both the theoretical knowledge necessary for application of modern ICT in transnational projects as well as hands on experience of ODL implementation.

The innovation of the project lies in the idea that both the above-mentioned aspects are evolved in parallel. In-service trainees influenced planning of the application in school and vice-versa and also results from the application in school affected planning of the in-service training. The selected subject (meteorology) was suitable for introducing young pupils to the principles of scientific inquiry, since weather observation and forecast is a subject close to everyday life, familiar to all pupils.

3. Project e-HERMES

3.1 Description, area of application of the project

"e-Hermes" aimed to the development and application of a pedagogical framework suitable for ODL 's implementation in secondary education.

The "e-Hermes" was an ODL project in the field of environmental education. An electronic tool (e-tool) in the form of an interactive Web page with potential for real time data analyses was designed, in which students from the participating schools entered environmental data (their own measurements from temperature to noise and energy consumption at home/school). The results were presented in comparative graphical representations, which gave the starting point for the student's discussion on differences and similarities of their countries. A means to present these ideas of the students was the Electronic Students Environmental Magazine (E.S.E.M.) through which the e-Hermes project intended to sensitise students about the global character of environmental issues.

3.2 Goal, characteristics of the project

The e-Hermes project was a student-oriented, decentralized project in the field of environmental education. Three main pedagogical principles underlined the implementation of the e-Hermes project:

a. Learning should be a collaborative experience: the project was based on the creation of a "virtual classroom", which means that every possible aspect of a conventional classroom was simulated.

b. Learning is the outcome of formulating questions, researching, investigating and sharing results: the advantages of familiarizing students with scientific methodology in comparison to simply transmitting knowledge are obvious.

c. Participation enhances learning: it is widely held that increased students' participation stimulates interest. Thus the participation of the students at all steps of the e-Hermes project was safeguarded. Students had the possibility to comment on the project and to influence the continuous development of the e-tool.

Additionally, the efforts in the field of ODL in secondary education up to now are fragmented. There is no specific guide, which will enable the teacher to use ODL in a clear and practically useful way. The e-Hermes project aimed to promote ODL through the development of a pedagogical framework. An outcome of the e-Hermes project was a handbook that: Summarises the contemporary experience of ODL programs.

Analytically describes a specific methodology for its implementation in secondary education.

The handbook combines scientific prestige guaranteed by the universities involved and its applicability was safeguarded by the fact that the users (teachers) were involved at all phases of the e-Hermes project. This combination secures education policy makers and curriculum developers with arguments in favour of promoting ODL and also user friendliness and practical implementation for any teacher intending to get active in distance learning. The strongest point in e-Hermes partnership was the close collaboration of 3 University departments of pedagogical research with 3 secondary schools, which had experience in distance learning practices.

4. Project SXEDIA

4.1 Description, area of application of the project

The program SXEDIA (Educational Network and Web of the Aegean Schools, meaning raft in Greek) aims to provide basic technology and know how to schools of small Aegean islands. The project includes provision and installation of necessary equipment, provision of educational software, teachers training in ICT and its use in education, connection of schools to Internet, distance education for teachers and pupils, constant help, educational and technical support.

The project refers to primary schools of less than 3000 inhabitants. It is implemented in 46 schools in 32 islands in an effort to improve educational standards in education of the area. Also the use of ODL techniques reduces the degree of isolation of these islands and offers new methodologies and techniques to the teachers.

4.2 Goal, characteristics of the project

The goals of the project are three:

a. Education. Better education is offered with the use of technology locally, the use of internet and ODL techniques.

b. Research. ICT in primary education as far as the state is concerned is not applied in Greece yet. This project will produce valuable results for the above scheme.

c. Development. The Application of ICT and its dissemination in the local communities is hoped that will increase the productivity of the local population of the islands. Web pages were developed, composition and drawing contests were proclaimed among the pupils. Databases were created to facilitate continuation and good management. Educational material was developed and videoconference sessions took place between the schools to enhance the idea of been together in the new experience. Distance learning (both synchronous and asynchronous) was practiced to indicate the new ways of learning.

5. Conclusions

The three projects were launched almost at the same time; two of them (e-HERMES and YOURA) had the chance to interchange experiences while SXEDIA was entirely independent from them. It is interesting that the three of them have attempted to apply of ICT and ODL techniques in specific subjects introducing a new way of practicing education. Of course the exact object in each project differs from that of the other two (thus the YOURA project concentrates in meteorology, the e- HERMES project in environmental education and the SXEDIA project covered applications in many subjects such as language, environmental education, mathematics etc). Also the target group differed among the projects (the YOURA project referred to pupils of secondary educational level, the e- HERMES and SXEDIA to primary education). The projects' objectives were also different, (the YOURA project and e-HERMES project had purely pedagogical and educational objectives while the SXEDIA project served wider social needs, among which the need to reduce educational and social isolation in the small islands.) The number of schools involved differed in the three projects –SXEDIA being applied in 46 schools, while each of the other two in a smaller number of schools. Finally YOURA and e-HERMES are international projects since they include schools and

Universities from three different countries and they are funded by the European Union, while SXEDIA project is a national project.

Despite the differences and apart from showing that there is a vivid interest in investigating the effects of ICT and ODL techniques on education, these three projects lead to some common conclusions as reported below.

One main conclusion of the three projects is that there is an immense requirement for teachers' in-service training. It is not adequate for teachers to have some basic knowledge on the use of computers. Teachers should be continuously inspired and should have technical support at least at the first stages of the application of ODL and ICT techniques. It should be noted that the success of the three projects is partly attributed to the fact that there was a constant help of schoolteachers from rather strong support teams. This help can take the form of encouragement, educational and technical care. It is believed that this care will broaden the numbers of educators using technology in the class. Out of this use, new ways will be developed and new methodologies will emerge to enrich the educational process.

Thus, for example, the backbone of the SXEDIA project was to inspire teachers and to make them consider the application of such innovative approaches as their own affair. At the same project, one of the main difficulties met was the fact that teachers were not staying for a long time in the small islands.

Related to the above, for a successful application of ODL and ICT techniques, familiarisation of students and teachers with these techniques is a must. It is not adequate for any target group to be simply acquainted with these techniques while being at a distance from them. Access to these techniques should be continuous and regular - at any cost.

The introduction of ODL and ICT are effective provided that the curriculum is redesigned and reshaped appropriately. There is no reason to use web applications simply as supplements to an existing curriculum that has been designed having in mind conventional learning approaches. If no reshaping takes place, the benefit from applying such new techniques is marginal. Given that conventional teaching has proved through the centuries to be rather successful, one should question whether it is worthwhile to introduce ODL and ICT if the expected results are but very small. Hence those who support ODL and ICT should be sure that the introduction of such techniques leads to a visible net educational benefit. Thus for example in the YOURA project, no-one would expect to have an incremental effect from teaching meteorology at the web if the educational material and the teaching methodology were similar to those applied in a traditional classroom. The big difference is made when meteorology is taught in a redesigned way, giving to the pupils the opportunity to undertake initiatives, to construct their own apparatus, to get in touch with other schools etc. Furthermore the e- HERMES project owes its success to many reasons, but definitely one should not ignore the adoption of the lively approach of monitoring environmental data in real time as well as the opening of a dialogue with other schools. Finally in the SXEDIA project, reshaping was not simply an approach adopted, but also an objective, since it was considered that the design of the existing curriculum could not take into account the specificities of the islands. In other words ODL and ICT techniques, followed by an appropriate reshaping of the curriculum promotes creativity and makes learning more attractive and more beneficial.

It is worthwhile to use ODL and ICT techniques in an integrated way, that is in three ways: as tools for searching and finding information, as instruments for delivering instructions for learning and as means for communicating with other schools as well as with other institutions, on a national and on an international level. Any application that uses only some of the above possibilities that are offered by ODL and ICT techniques, leaves unexploited an excess capacity. Thus, as an example, in the SXEDIA project where one of the objectives of the application of ODL and ICT techniques was to reduce isolation of the islands' school communities, it was essential to use the innovative approach in a global way.

ODL and ICT techniques should be applied in parallel with the adoption of other educational principles. Thus, these techniques seem to be in conformity with trans-disciplinary, inter-disciplinary and inter-scientific approach in education. This is so since it is insufficient to restrict the search for

information on a subject so as to coincide only to some explicitly described, predetermined requirements. Instead searching through the Web should be flexible and should give to the pupils the opportunity to direct their knowledge towards their own paths. Thus, as an example, in the YOURA project meteorology was only an excuse for pupils to open an international dialogue, which was directed towards the exchange of information about their countries and their people, not only promoting knowledge, but also ideas as well as ideals (eg common European consciousness, multi-cultural tolerance etc). Environmental education was a good framework for pupils to create their own electronic magazine in the e-HERMES project.

From the three projects it was concluded that the introduction of ODL and ICT techniques cannot be effective unless there is a collaboration and cooperation of all groups involved: teachers, pupils, parents, administrators, and in some cases (like in the SXEDIA project) some NGOs as well as local societies.

Constant help is needed for the application of ICT and ODL in education.

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OPEN DISTANCE LEARNING MODEL AT PETRU MAIOR UNIVESITY IN ROMANIA

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Abstract

The Romanian Ministry of Education and the World Bank are financing a program for distance learning development at Petru Maior University of Targu-Mures in Romania. The curricula of the program is focused on master studies in Quality Management, with two years duration of studies.

We developed a distance learning model that combines both asynchronous and synchronous events roughly in an 80%/20% distribution, following a model developed in USA at Renssellaer Polytechnic Institute [2]. For the asynchronous portion, we augmented IBM Lotus Learning Space with a technique that humanizes learning through video and audio streaming snippets.

Introduction

Most of us think of a web-based course as one that focuses on asynchronous activities for learning and communication. Students typically work individually and make extensive use of email and bulletin boards to communicate with the instructor and each other. This approach point out three shortcomings: course completion rates are very poor, many learning modules lack structure of any sort, and most courses are cold and uninviting.

We set out to try to resolve these problems by looking at many web-based courses, revisiting instructional design principals, and applying human-computer interaction techniques to the problem.

Asynchronous 80 / Synchronous 20 Model

In designing a traditional course, we accept the schedules and constraint given to us by the administration. Someone, somewhere, decided that instructors and students should meet a set number of times per week for a set number of minutes and for a set number of weeks. Of course, there are other casual meetings, such as office hours, but these are rarely specified or recognized. Likewise, students are told to "go study" or "do problems 1 through 5" without much structure or guidance.

Web-based courses have the potential for introducing a totally different paradigm. Classrooms are not needed, hence no need to dictate meeting times. All work is done asynchronously. There are accreditation requirements, but we seem to be comfortable with the rule that if we cover the same amount of material as a traditional course, those requirements are being met. This is totally opposite from the largely synchronous traditional model. For some students it works. However, we have experienced completion rates of less than 50% for some courses, due to learning style, lack of organization, etc.

In the distance learning our investigation states that some time should be allocated to asynchronous activities and some time to synchronous activities. In other words, a learning experience needs to have some mix of asynchronous and synchronous events. The proportions will depend on the material being covered, the learner's maturity, and the instructor's experience. In some cases, this may lead to 0/100 distribution, in others a 90/10, or something in between. The important point is that the proportion must be determined explicitly by the factors mentioned, not implicitly by happenstance.

Our model states that learning is a combination of information and interaction. Information can be presented in a variety of ways, including mini-lecture and individual study. Interaction comes in three variations: learner-instructor, learner-learner, and learner-content [3]. To better design the activities explicitly, we use the following allocation table.

Table. Function Allocation Matrix

	Asynchronous Activities	Synchronous Activities
Information		
Learner-Instructor Interaction		
Learner-Learner Interaction		
Learner-Content Interaction		

This table helps us to think about the various aspects of the course and forces us to explicitly assign activities to each of the cells. You might ask, "How can I get synchronous interaction with students when this is a web-based course?" Chat sessions and conference calls are well suited to this task. Likewise, Internet audio holds great promise for accomplishing many of the synchronous activities. In addition, information can be delivered synchronously without lecturing, as mentioned before.

Asynchronous Structure

A second shortcoming in web-based courses is the lack structure. More often than not, a web-based course consisted of Power-Point slides converted to html. Another extreme is page after page of detailed text. This is particularly troublesome since the usability community has shown repeatedly that people do not read long paragraphs on the web [4]. Skimming seems to be the mode of processing. How then, can we better organize the content we place on the web?

We revisited some important concepts of learning, and adopted an Interactive Distributed Learning (IDL) Cycle used at Rensallaer Polytechnic Institute based on the works [5, 6, 7]. This effort is intended as a reminder to faculty and is applicable to any type of course, asynchronous or otherwise. Figure 1 shows the cyclic nature of the design, indicating that all elements should be considered for each and every learning experience, regardless of length.

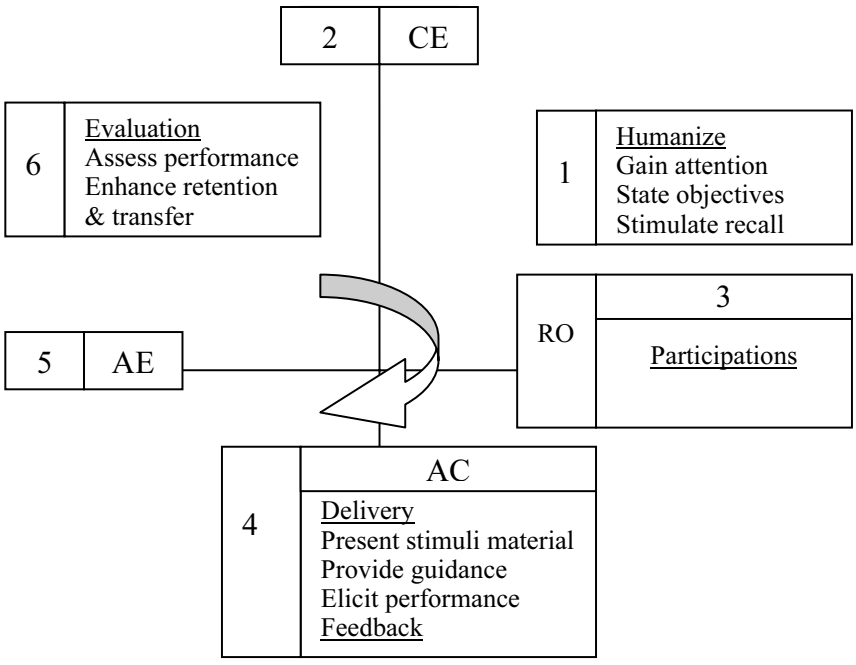

Fig.1. Distributed Learning Cycle

It states that people learn in different ways and the different styles should be accommodated in any learning experience. The vertical and horizontal axes represent the 4 dimensions of the learning style:

- (CE) Concrete Experience provides the learner with either a physical or emotional experience.
- (RO) Reflective Observation causes the learner to reflect on that experience and share their observations with others.
- (AC) Abstract Conceptualization is information from authoritative sources, conveying theory or principles.
- (AE) Active Experimentation provides an opportunity for learners to try out those principles in real problems.

The underlined texts in Figure 1 are design components of the distance learning [6]. With the web, the dividing line between "distance" and "distributed" is disappearing. Many good teaching techniques have been developed for distance learning and are very appropriate for distributed learning.

Humanizing sets a climate that makes learners feel a part of community. Participation emphasizes active learning. Message Delivery transmits information to the learner, whereas Feedback tests the correctness of the understanding of the message. Finally, Evaluation checks to see if the teaching techniques are working.

The last elements of the Cycle are taken from the field of Instructional Design meaning in fact "designing instruction" [7]. Specific events must occur in a learning experience and these events are arranged sequentially. Not all instructors are aware of these concepts, so these are incorporated in the cycle as a reminder.

The Cycle starts with a humanizing event, along with gaining learners attention, stating objectives for this module, and stimulating recall of relevant information presented previously. A concrete experience gives the learner a feel for what principles are to follow, although they may not yet understand it. Reflective observation affords the opportunity to share that experience with others through learner-learner interaction. Principles are then delivered with feedback to the learners on their correctness. Active experimentation then allows the learners to apply those principles to a new problem. Finally, the teaching techniques are evaluated, learner performance assessed, and the stage is set for the next learning module.

Adding Humanization

A third observation of web-based courses relates to their cold and impersonal nature, their lack of empathy. The social relationship with the computer mostly goes overlooked. The challenge is to add the affective dimension without adversely impacting the cognitive dimension.

This raises a fundamental question as to what a "real" instructor does. Obviously, there may be some presentation of content, the function emphasized by the administration (contact hours) and often by students. However, functions that are more important include humanizing, clarifying difficult concepts, presenting personal anecdotes and examples, commenting on points of disagreement, raising questions for students to think about, and motivating students to learn. How do we incorporate these functions into an asynchronous course?

It should not be surprising that these issues have already been addressed, but in a different medium. Correspondence courses may be the original form of asynchronous learning and there the textbook, or source of information, is always accompanied by a study guide. The study guide provides orientation, task direction, learner assistance and self-assessment. In other words, it functions as a surrogate instructor or the "Guide on the Side". So, the electronic version of this concept, includes both a Work Window and a Guide Window. The Work Window has frames for html course notes and supporting Lotus Learning Space functions.

The purpose of the Guide Window is orientation, task direction, learning assistance and self-assessment. The Work Window may be likened to the textbook and/or laboratory and the Guide Window likened to the instructor. Currently the Guide deals with orientation and task direction.

The Guide is dismissible, persistent, synchronized, object-oriented, and extensible. The learner is totally in control, choosing to use the Guide or not at any time in the learning process. The learner may dismiss the Guide at any time, and hence cease it's functioning immediately, or reinstate use of the Guide when desired. Only the first three specifications will be described here.

Dismiss ability is afforded through an icon on the Course Notes HTML (Work Window) that controls the state of the Guide. Using the icon, the user toggles between the enabled and disabled state using a caricature of the instructor. If no Guide is available for a particular Course Notes HTML page, a unique representation is used to indicate that fact. Dismissing the Guide removes the Guide Window from the screen for the duration of the learning module, unless explicitly reinstated by the learner.

A synchronized Guide Window means that there is a Guide appropriate for each Course Notes HTML page, although "No Guide" is an acceptable option. The Guide must be used for an explicit purpose, not just for cosmetics. We found that various forms of the Guide are necessary. The page in the Work Window determines and displays the appropriate Guide Window. Although the Guide Window has a consistent look and feel, the contents change depending on the instructional task being performed and the actions occurring in the Work Window. Currently we have identified three flavours.

The streaming video flavour is used for orientation when little content is presented in the Work Window. Here the focus is on the Guide Window. An appropriate digitized video stream of the instructor is presented.

The streaming audio flavour is used for task direction and learning assistance when the Work Window contains material of major importance.

The text flavour is used for either learning assistance or self-assessment when focus is to be concentrated on the Work Window. Simple instructions, comments or reminders are placed here for access at the learner's discretion.

Conclusions

Although we cannot draw any major conclusions from just one course, we are encouraged by the results. Students were very positive toward the course. At the same time, frustration arose from the vagaries of the Internet and the lack of consistent standards and bandwidth. The Guide added humanness but suffered from the Internet shortcomings.

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THE BA COURSE USING NEW INFORMATION TECHNOLOGIES IN THE FOREIGN LANGUAGE CLASSROOM AT THE UNIVERSITY OF LATVIA

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Introduction

Multilingual communication within the world community is important for economic, political and cultural interactions. In this global environment language learning is becoming increasingly important. At the same time, recent advances in instructional technology can help make the promise of building intelligent tutoring systems in advanced technology laboratories to teach these language skills a reality.

Because Latvia is a small country, foreign languages are of utmost importance in politics, economics and the sciences. Moreover, since achieving independence, Latvia has rapidly increased international contacts in all spheres of public life, trade and industry. Independence has changed Latvia's attidudes towards the learning and teaching of foreign languages.Foreign languages are increasingly perceived as useful for a variety of purposes, such as intercultural understanding, academic studies and professional as well as personal travel. This new view is at the root of key trends in foreign language education. There is now emphasis on an early start to foreign language instruction, increased contact hours for language studies, communicatively oriented teaching and an intercultural approach. Furthermore the range of languages taught has also increased, with an emphasis on English, German and French, but a great variety of others are also offered, such as Japanese, Chinese, and the Scandinavian languages (Kangro I.1996,67-71).

With independence came the opportunity and the need to entirely redevelop all school curricula and so leading methodologists in foreign language teaching in Latvia are trying to find the best ways possible to assure a high quality of language awareness. One of the optimal ways to intensify and increase the relavance of foreign language learning and teaching is to integrate the use of media technologies and Internet in the teaching and learning process.

Starting in 1987 computer assisted training, test, drill and authoring tools were developed, tested and applied in language classrooms at the University of Latvia and the software programs. More than 200 computer assisted language learning (CALL) programs for German, 150 for English, 120 for Russian and 120 Latvian language learning were implemented in Latvia’s school curriculum. In the beginning stages, before 1990, the programs were most often merely simple corrrection programs (true/false and multiple choice exercises) due to the limitations which the older soviet microcomputers presented. These CALL programs consisted in tasks in which all the learner had to do was point and click. The early programs, at best, only encouraged a "very active way of being passive"(Davies G.1997,116). Nevertheless, it was a way to familiarize both students and teachers with the use of technology in the foreign language classroom.

Since then, a well equipped high-technology Computer Pool at the Faculty of Education and Psychology has contributed to the second stage of the introduction of computer technology to language learning at the University. This second stage has been devoted to testing the possiblities of CALL. Future teachers have been trained in the Computer Pool. University students are offered courses dealing with the use of CALL, as well as of satellite TV, e-mail, Internet and multimedia programs in foreign language teaching.

Course Methodology

The BA course teaches the students to be able to integrate the use of technology with the current foreign language teaching methodologies (with an emphasis on "procedural knowledge", and the changed nature of learning.) Furthermore, the students in the course learn to analyse the materials in

view of the practical application of available technology their own lesson plans. The course teaches students to approach the use of technology critically and focuses less on the mere propogation of information about the software programs available. In addition, the course is designed to explore and access, through cooperative discussions, for example, the ways in which CALL programs and multimedia can change the nature of language learning and generate new types of teaching practises. Various kinds of interactions are analysed and different types and levels of interactivity, not excluding that of the teacher, in the multimedia enviroment are discussed. "We have to give up the concept of a teacher who is a "knower", allowing his students to share in his knowledge. The aim is no longer to disseminate knowledge as such, but it is the knowledge of how to access and acquire information (knowledge). To express it in the terms of cognitive psychologists: what matters is "procedural knowledge", not "declarative knowledge". The so-called process-oriented classroom - with a focus on learning to learn - has already effected this change"(Legenhausen L.1996,24-35).

The course consists of two parts: a theoretical and a practical. The first part of the course is devoted to the theory surrounding the development of CALL and multimedia programs, and the second to the implementation and analysis of the programs developed by the leading software firms. Students analyse the software available in the international market and, using these programs, make outlines for their own lessons. A further step is that the students then use authoring tools from Wida Authoring Suite (such as Storyboard, Testmaster, Machmaster, Long Read etc.*)* and from Teleste Partner Tools to develop their own testing and teaching programs for grammar, vocabulary work, and writing etc. By developing their own programs, teachers are then better able to implement CALL and other multimedia programs in their classrooms. The goal is to enable teachers to create multimedia teaching and learning materials without any programming knowledge in accordance with individual learner or a group of learner's needs. As a part of the course, a group of students at the university has created a program for a Latvian Highschool (10^{th} Grade) called "120 Useful Exercises for English". This program is posted at www.liis.lv.

In order to develop vocabulary, students have developed learner's data banks which provide new dimensions to vocabulary work. In the learner's data bank very new word has to be entered into various fields which include synonyms, antonyms, grammatical information, a register and illustrative examples. A modification of this learner's data bank is also being developed together with future translators to collect terminology for the EC and for the Latvian legislative system. This process can be described as process of "information gathering, information processing and reorganization and automation" (Rüschoff B.1997,138) and as such follows one of the basic laws of language learning which Ellis has formulated, that in order to learn a language, one must use it. Ellis stresses that the good language learner should "seek out all opportunities to use the target language"(Ellis R.1985,122).

The course presents the Internet as both an Information Superhighway (emphasis on information) and as a global Village (emphasis on communication). Use of the most popular search engines such as Yahoo is taught, showing the students the most efficient means of navigating the web by teaching students to search by keywords and/or different categories and subcategories. Interactive FL teaching/learning materials/exercises/tutorials are demonstrated and analysed as are ways of finding authentic material.

E-mail is a tool for intercultural communication around the world. E-mail "provides students an exellent opportunity for real, natural communication" and "empowers students for independent learning" (Warschauer M. 1995, 2). The pedagogical aim of the use of E-mail is to encourage teacher students to improve their second/ third language skills working with authentic materials. Establishing learning projects via e-mail puts students in contact with native speakers or English/German learners around the world and provides an authentic context and motivation for communication. Two learning projects, "Christmas in Germany" and "Varieties of Modern English Around the World" were particularily successful. Students worked with e-mail journals, teacher-student consultation via e-mail, electronic discussion, surfed the Web and used MOOs (Multiple User Domains Objects-Oriented). As these projects demonstrated, "such learning projects will help to develop learners' language awareness and understanding of the structure and funcionality of the target language" (Rüschoff B.1997,139). The end result of the use of Internet and E-mail in the classroom is high student motivation to improve their language skills as well as a collection of www-addresses which the teacher can use.

What should a teacher know and be able to do at the end of his/her training? A teacher should have knowledge of basic computer skills, knowledge of what software is available, the ability to evaluate/test software (including, possibly, the acquisition of authoring skills, and a familiarity with hypertext) and the skills to integrate multimedia in the lesson and curriculum.

Conclusions

Using New Information Technologies in the FL classroom has the following important features*:*

Firstly, it motivates students to be more curious. Secondly, it stresses the great opportunities multimedia provide for differentiation, especially in mixed-ability classes. Thirdly, what multimedia and telematics best offers is a real context, authenticity and topicality of materials and a cross cultural perspective. Furthermore, multimedia is a highly dynamic medium which has the potential of generating dynamic types of interactions, not only with the computer but with other students and teachers as well. In other words it generates cooperative learning, learning accompanied by the instructor and autonomous learning. Moreover, teachers need to understand that their roles have to change and that the physical space of the classroom will need to be changed as well in order so as to accommodate different kinds of interaction: small group, student to student, and student to computer. Also, "electronic communication can help foster a new teacher-student relationship in which the students become more autonomous and the teacher becomes more a facilitator" (Warschauer M.1995,93). In conclusion, combining various learning strategies, various kinds of interaction and different types of implementation confronts the learner with different language spheres and motiviates him or her learn the second (third language) in modern learning enviroment.

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TO A DYNAMIC STUDY-PROCESS BASED E-LEARNING SOLUTION

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Introduction

It is common practice that in an e-learning context, the web-based courses are structured in modules based on the content outline principle of a textbook.

In our vision an e-learning course has to be structured as the *study-process* that is based on one or more predetermined learning objectives.

A real case will be demonstrated. The course design, including the learning objectives, the organised learning activities and the linked learning content will be explained.

Our advanced e-learning platform consists of a student portal, an instructor portal and a central warehouse of learning content.

We postulate that a course as implemented in an e-learning context must fulfil some basic requirements such as reusability, interactivity, and personalization.

Ongoing research points in the direction of standard XML file format to store the learning materials.

Another point is the automation of the modelling process.

And last but not least we'll evolve to an implementation of a real dynamic e-study-process, that will guarantee a personal learning process for those students learning in a scenario of self-paced learning.

1. The study-process base approach

The *study-process* is based on one or more predetermined learning objectives. As an example, the course "Introduction in business informatics" is structured as follows:

1. learning the basic knowledge on a first level
2. introduction in the practice of making presentations and presentable reports with powerpoint and visio
3. deep knowledge of one learning content topic
4. observation of the practise of this theme in a company of choice
5. thorough study of the entire learning materials.

2. Study-process based e-learning solution

2.1. Activities and content

To reach the learning objectives of the study-process, some learning activities, such as lectures, individual reading, practical sessions, …. will be organized. Those activities are supported by ICT applications and are organised in an e-learning platform.

The learning activities have to be linked with related learning content/documents.

On point of the learning content we can distinguish some important characteristics:

1. A course will be repeated several times as a consequence the content will be re-used several times.

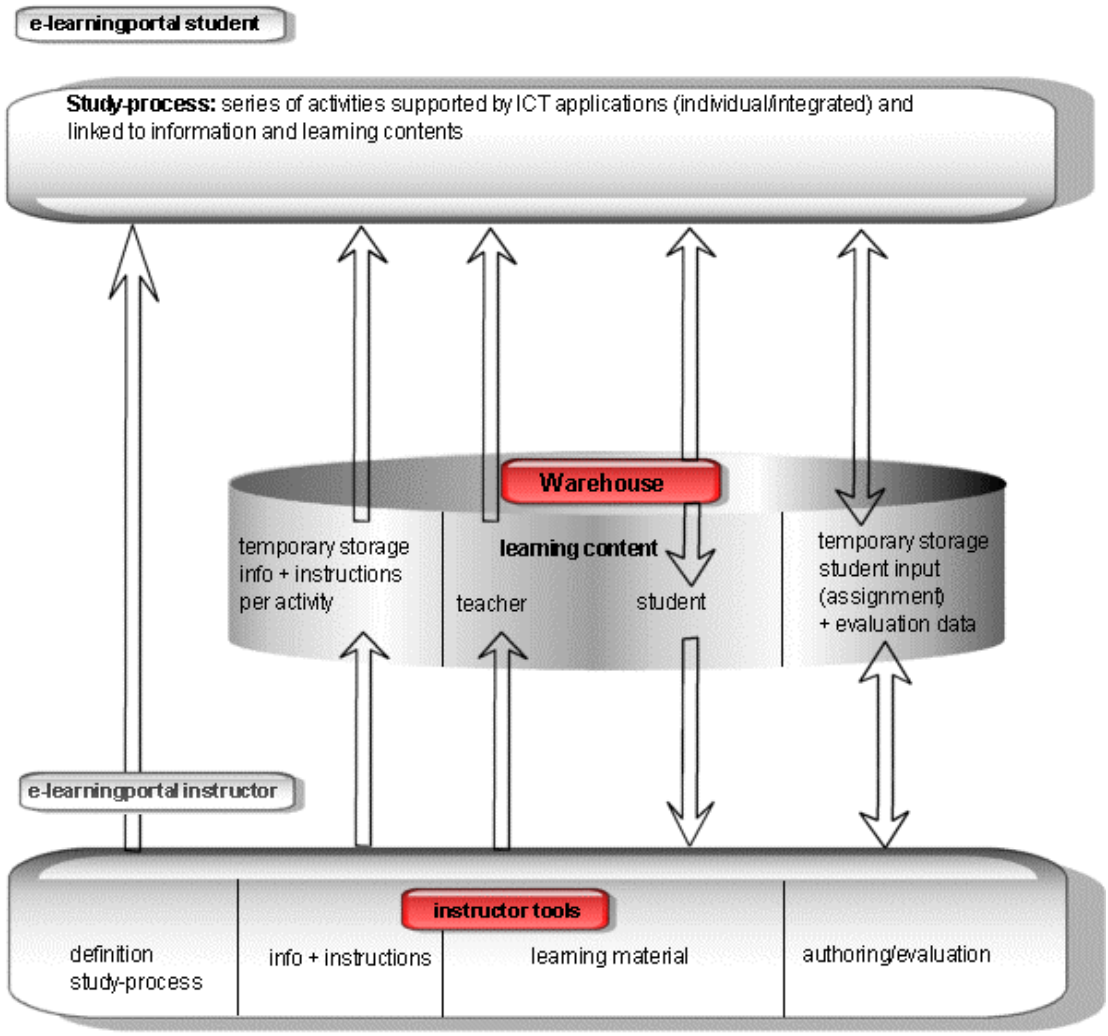
2. the learning content itself is subject to changes. The lifespan of the content is dependent on the kind of discipline.
3. the demand for certain learning contents is also subject to changes : the opportunity to include a topic into the course can sometimes be questioned
4. learning content can be shared with other professors, who want to use it in their own lectures too.
5. the level of the learning content will fit on a flexible way to the knowledge level of the focused student group
6. applications of the course will address the type of student

Keeping in mind those characteristics and the methodology of process-data independency, the content is organised in a central warehouse of the e-learning platform independent of the activities. The documents are stored as standard html-files in our warehouse.

The learning activities organised in our e-learning platform (LearningSpace5 of Lotus Notes) can be linked with those html learning content documents.

2.2. E-learning platform

One or more activities can be supported by ICT in an e-learning platform. It is composed of the student portal, the instructor portal and the central warehouse.



3. A dynamic study-process based e-learning solution

3.1. New standards XML, XHTML applicable for learning content

We postulate that a course, as implemented in an e-learning context, must fulfil some basic requirements such as reusability, interactivity, and personalization in the near future. Ongoing research points in the direction of standard XML file format to store the learning materials. XML provides a standard way to structure, store and send information. XML is a cross-platform, software and hardware independent tool for transmitting information.

XML was designed to describe data and HTML was designed to display data. HTML is evolving to XHTML, a mark-up language that is useful now and in the future. It can be seen as a combination of HTML and XML, and their strengths. XHTML pages can be read by all XML enabled devices AND while waiting for the rest of the world to upgrade to XML supported browsers, XHTML gives you the opportunity to write "well-formed" documents now, that work in all browsers and that are backward browser compatible

Till to now the documents in our warehouse are stored as HTML files and their metadata is stored in a relational DB table. In the near future we will evolve to the new standard XML/XHTML again combined with a relational meta-datatable. As we have now the user-friendly SAVE AS HTML in Office 2000, we'll have soon SAVE AS XML in Office XP.

Direct links will be available from the advanced e-learning platforms.

3.2. Evolution to automated process modelling

The study-process has been modelled by the responsible instructor and implemented in the schedule entry of the e-learning platform. This modelling activity can be automated and made flexible, fitting the requirements stated already in this paper.

The same XML standard is here also considered. The instructor creates a XML scheme for this study-process using a modelling tool. Open University Heerlen works this way with Edubox tools and EML. The e-learning platform has to be able to address this model.

3.3. Evolution to a dynamic implementation of the study-process.

When a high level self-paced learning is set forward, the study-process has to be dynamic on point of delivery of activities and of learning content.

The course must be differentiated and must be adaptable to the group of students. Even within the activities themselves, it must be adaptable to the type and the knowledge of the individual student, taking into account the characteristics of the student (learning capacity, learning style, …).

On top of the e- learning platform a meta layer is constructed who is in charge of process flow management. The process flow follows a number of branches of the generic flow, constructed in a tree structure. This happens dependent of the real values of a number of variables, which are stored in the XML scheme and the accompanying metadata tables.

A high level of self-learning demands also a high quality learn content, which means a sufficient number of interaction and animations have to be offered.

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E-LEARNING DEVELOPMENT ENVIRONMENT JTAP – NEW APPROACHES TO E-LEARNING CONTENT CREATION

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Introduction

The technical infrastructure for highly productive training over the internet is available. Nevertheless, content creation is still difficult if one wants to implement multimedia material with interactive parts that is beyond simple test forms. Students of the University of Applied Sciences in Wedel, Germany, have developed an innovative system to make content creation easier. Based on its Open Source licence, the platform-independent software is available for free for anyone to use.

E-Learning Material Today

The combination of computer-based training and the universal communication capabilities of the Internet has made a wide range of new eLearning applications available today. The successful merging of these two technologies can now be utilized for a variety of different, highly productive training functions including online lectures, documentary videos, simulations, virtual experiments, case studies and game-based learning. In most cases today, notwithstanding this large array of technologically-viable options, we still find simple texts and scripts only. This material, sometimes even missing a hypertextual structure, is offered under the limited capabilities of a browser-based program. Using a metaphor this is somewhat like having the technology for printing four-coloured books but using stamps to write the book content instead.

In addition, most of today's authoring tools are still limited to simple testing options like multiple choice, drag-and-drop and similar basic types. Originated in the narrowly-focused and fairly restrictive ideas of 1960's academics, this kind of training is not an invention of eLearning. But this concept of non-interactive "programmed learning" has failed time and time again, because of boring those trying to learn as well as limiting learning and testing strictly to the lower level of cognitive skills.

The gaps we have indicated above lie, fundamentally, between the methods of content delivery and content creation and have existed for quite some time. A group of students has recently developed an authoring software that they believe successfully bridges these gaps. The software is called "jtap": Java Teach And Present.

Four Level of Content Creation

With jtap, they have introduced a four level-model of content creation. In this model, you can create virtual slides and arrange them to different curriculum types. Each of these virtual slides may contain static, dynamic and interactive elements. The model takes the different technical skills of trainers into account. Most trainers start on the easiest level by using standard elements (text, graphic, video, animation, sound, standard assessment) in a WYSIWYG editor. These elements can be either static (text, graphic objects, html documents), dynamic (keyframe animation, video, sound) or interactive on a low degree (smart answer fields, paint areas, multiple choice tests).

Without any previous knowledge of the software, trainers can construct the slides on a virtual white board. Each slide will be organized in a multi-layered timeline. The multi-layer concept allows the combinated projection of more than one slide on the board. This means one can have as many background, foreground, chapter and content layers as he wants. For example you can place a table of content element in a foreground layer that is visible during the complete course whereas the content changes on a different layer each time you navigate to a different page. In addition you can use chapter layers containing one slide for each learning episode. The table of content element can be generated automatically. Several alternatives for navigating through the course are supported. For a student’s orientation there are many possibilites to indicate the current progress of the course.

Students have the opportunity to define their own preferred structure of the content. On each slide they can write down their notes and drawings. Beside the core information you can insert links to additional learning material on a slide. The material will be available within a jtap course for students that want further insights or need more detailed explainations.

The second level allows the elements to interact with each other by selecting simple actions. You can define a list of actions for different events. By clicking on a picture for example, you can show or hide other elements, change their size, color or position and start other media resources (video, animation) within the same slide.

The third level offers a simple script language (Tool Command Language, TCL) to allow the addition of real functionality to each slide. This is useful for any type of calculation, controlling and automation of processes. The response to test evaluations or mouse events can be defined in small scripts. A script allows the introduction of new conditions for tests, e.g. entry levels, exit or question path instructions. Simple programs can be created in an EasyScript mode by adding actions to a command list using drag&drop. Special actions allow the implementation of animation effects in a single line of code. The script language supports regular expression, string operations, lists, condition statements and several control structures.

On the fourth and highest level one can optionally write new element types by using a programming language such as Java. This allows the full integration of complex simulations and experiments. Using an object oriented language in combination with the powerful infrastructure of jtap will significantly reduce the time necessary for development. The developer can concentrate on logcial processes while using the graphic environment of jtap to visualize the results.

All levels can be combined and imply the suitability for each learning paradigm. Standard elements can support the learning processes for base knowledge in a traditional way. Simulations, virtual experiments, case studies and game-based learning can be implemented by using a script language or an object oriented programming language. Real interactivity in a virtual world will always require some program development. Trainers can concentrate on the content while the production of sophisticated interactive elements can be outsourced.

Support for Collaborative Distance Learning

Courses created with jtap can run in a stand-alone environment or can be synchronized on a large number of computers in a fully collaborative environment. A group of students can navigate together through a course - each of the group's members from a different physical location in the world. All students see the same slide at the same time. In addition they can manipulate the elements of a slide. The changes will be broadcast to all other students. As a result the slides can be used as a common working space for the students. jtap knows a role concept that differs between the master teacher, assistants and students. The master starts a learning session and is allowed to control it.

For each layer of the timeline it is possible to assign a scope:

- public layers
- group layers
- private layers
- master layers

Public layers are visible for all participants of a learning session. However like whiteboards in a real classroom public layers are only accessible by the master. He has the chance to temporarily transfer rights for writing and manipulating to one of his students.

While public layers are fully synchronized between all participants, group layers are not. Students can be assigned to a learning group and each group has its own set of group layers. These are only synchronized within a group. The analogy to a classroom are documents commonly worked on by all group members. These can be used to record the results of a group work.

Private layers are only used by a single student. Everything the student is doing on that layer is of his own business, invisible to the rest of the learning group. In a real classroom situation that would be the private notepad of the student.

Assignments can be arranged in different working modes now. A certain amount of time can be given to each student to solve a problem for example. He will work on that task in his private layer. After a while he will present his results to his group in the group layer. At the end of a lesson the group summary can be packed into one of the public layers to share the ideas with all students. The master will transfer the writing permission to one group at a time.

Master and assistant(s) do not belong to a certain group, but they can join any group temporarily to support its members. If that happens, they behave like normal group members and share the synchronized view of the group layers. Private layers can also be shared between a student and the master, if the student invites the master.

Learning - Anywhere at Anytime for Anyone?

Courses that are created with jtap can be taken on any computer platform. jtap was developed in Java and runs on Windows, Linux and Macintosh. Students are free to choose their system and no one will be excluded. In the future jtap is going to run on set top boxes and portable devices. Then the expression “learn anywhere at anytime” is not only a phrase but will gain more significance.

Since jtap is free available for anyone, not only professionals but students can transfer traditional learning material into multimedia content. The cost efficient production of eLearning units is one of the intentions of jtap. The created courses can be exchanged world wide and easily adapted to the specific needs of a concrete lecture. The reuse of materials is made as simple as possible.

The eLearning development environment was created at Wedel University during the last two years to meet the requirements for virtual learning material. Many eLearning activities are established at this university for a long time. All student assignments are supported by newsgroups, lecture scripts are provided by handout servers and the administration of exams is web based. There is an intensively used campus information system providing daily updated information. A campus radio is broadcasting exclusive news on the intranet. The next step is developing interactive course material that is provided in addition to lectures. The system offers an explorative and collaborative environment to all students.

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FILEB – E-LEARNING FOR CFD TECHNOLOGY

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Introduction

The usage of numerical flow simulation (Computational Fluid Dynamics) as a basic technology during the development in engineering is growing during the last decade [1]. Parallel to this the lack of highly educated engineers from universities and the development of engineers in industry in this specific area has become more and more obvious.

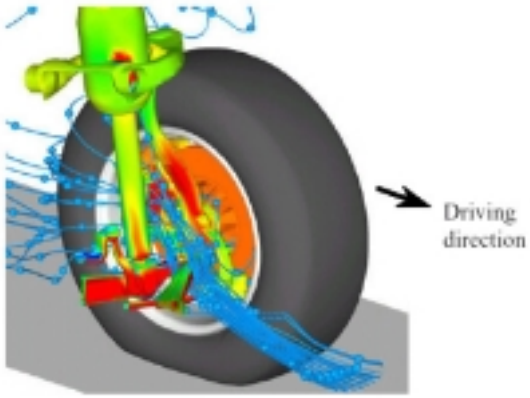

Fig. 1: Cooling of a car's brake

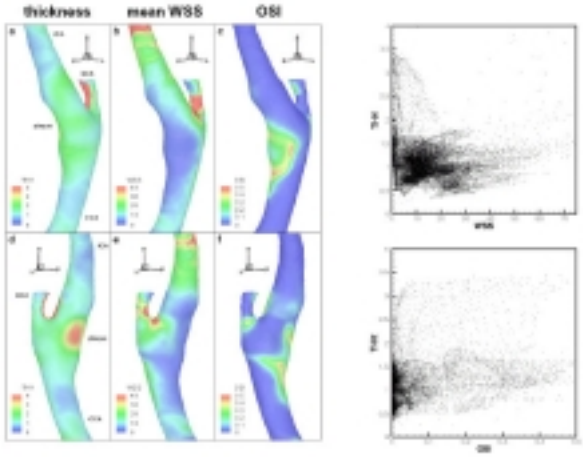

Fig. 2: Blood flow in humans [3]

State-of-art education in CFD

The application of **C**omputational **F**luid **D**ynamics (CFD) in industry, especially in SME´s, is hindered often by insufficient knowledge and, consequently, little confidence in the results of the CFD calculations. The necessary competence for applying CFD should emerge normally from education at university level. But during the past the education of engineers and physicists generally has not developed in the same way as the usage of CFD as a supporting design tool has become important for industry. At universities CFD is still presented in the same way as it has been done for years - normally during the last hour of the basic fluid dynamics lecture. Only doctoral candidates will have the opportunity to work with CFD and high-performance computing for a couple of years and thus to get the necessary expertise before they leave the university for industry. From these facts the current unsatisfactory – if not unacceptable - situation in Europe arises that the industrial need for high-educated CFD-engineers and physicists is a factor of five higher than the number of scientists leaving the universities in this field (e. g. Germany: need of 80 per year; available twelve to fifteen CFD experts per year; in other European countries the relations are similar).

FILEB – E-Learning tool objectives

FILEB will bridge the gap between experienced users of CFD in large companies and newcomers to this field in SME´s and thus stiffen their competitiveness and lower their said financial risk. To satisfy this demand the aims of FILEB are:

- to develop further the skills of engineers and physicists working in the industry, mainly in SME´s;
- to provide a high quality, reliable, and affordable learning and training environment („virtual university“) for young professionals and students;

- to clear the obstacles of using CFD simulation by providing a complete and easy-to-use learning and training tool.

To fulfil these requirements the E-Learning tool has to include the following elements:

- generation of a learning and training system as a tool box which comprises a virtual fluid dynamics laboratory, course material, a fluid dynamics data bank with videos and a **C**omputer **A**lgebra **S**ystem (CAS) to analyse single equations;
- preparation of a graphical user interface (GUI) for linking of all components.

To meet the technological objectives and to satisfy the aims of FILEB the tool box has to consist of:

- an advanced, perspicuous, clearly arranged, and guided learning and training environment
- a robust (numerical stable) CFD solver providing two-dimensional as well as three-dimensional simulations
- a flexible preprocessing with different types of grids
- a visualization facility for post-processing
- an on-line documentation with exercises
- a manual with exercises
- ERCOFTAC guidelines for reliable CFD computations
- fluid mechanics lecture material
- a CAS with programmed example notebooks for simple flows
- video material on fluid mechanics experiments
- a data bank with experimental results (general and related to the examples)
- physical properties data bank.

Finally it will enable the FILEB user to

- perform simulations within the *first two days* of training
- become confident in the results of the simulation by comparing them with experimental data
- use FILEB as a self-training tool.

The FILEB tool box will be available via *Internet.* With the *Internet* the linking of FILEB to the industry will be facilitated and further on linking to a kind of Job-Change will become possible.

The available CFD simulation tool will be linked together with all the relevant information about experimental (and theoretical) results of typical industrial relevant flow configurations. The comparison of self-generated results from FILEB with those experimental results will give the trainee a high degree of confidence in his/her own work and thus will lead to a high level of education in CFD technology. The visualization of experimental results and the arrangement and execution of the experiments by video additionally enables the user to compare the time and efforts needed to conduct the complete experiment with the (regularly much lesser) time and efforts to carry out the CFD calculations.

The current state-of-the-art in CFD applications training for engineers and physicists requires a lengthy search for suitable tools in different media (*Internet*, journals, seminars) and high efforts of time, money, and manpower to put together and test the available components, thereby not excluding the risk of missing important ones. The innovation introduced by FILEB as said above is the combination of an advanced, reliable, and robust CFD simulation tool with all relevant experimental results of several typical flow configurations. To give the trainee a first experience of own success as early as possible emphasis is placed on the opportunity of achieving results of the CFD calculation within the first two days of working with FILEB.

Components of the E-Learning platform

The E-Learning platform will consist of the following basic elements:

- **eUG**: The **e**lectronic **U**ser **G**roup serves as the permanent discussion forum, which is accessible without time and location restrictions.
- **eTC**: The **e**lectronic **T**raining **C**enter is the distance education platform. Courses for self-education and tutor (expert) guided courses will be provided in this area.

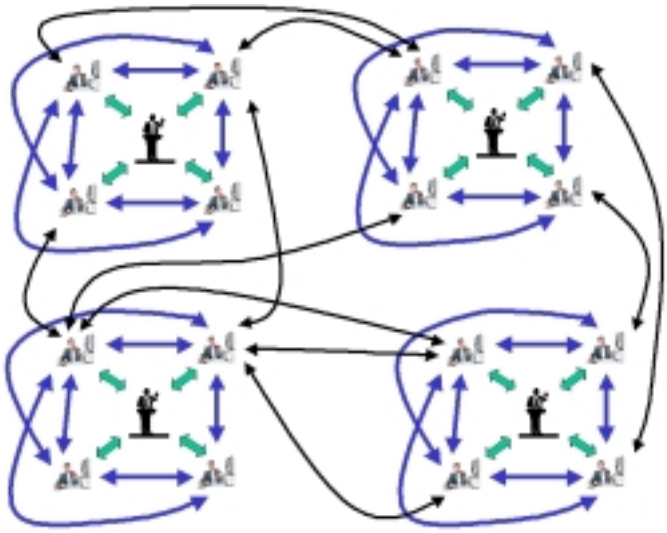

Fig. 3: FILEB Learning and Training expert network

The FILEB is a flexible personal model for self-reliant e-learning and training which enables the learning citizen by continuous guidance and motivation to improve his skills and thus to increase his chances of employment as a contribution to life-long learning. The *Community of Learning*, the user of FILEB enters via the internet, is the ***e-User Group*** (eUG, provided in the framework of FILEB) which connects him with other interested individuals using FILEB via the ***e-Training Center*** (eTC, also provided in the framework of FILEB). The eUG enables each user of FILEB to communicate via the eTC with other individuals using the same learning and training tool and thus to profit from interchanging experiences. Normally the eUG provides at least one in the special learning purport experienced expert with pedagogical background who acts as a mentor (s. Fig. 3). With increasing skills in principle each member of the eUG may grow to an „expert“ with certification after some (in the course of the project to be defined) qualification tests.

Conclusions

Recent discussions at the occasion of the world conference on applied fluid mechanics have demonstrated the need of an improved education in CFD technology. It is suggested, that this will improve the quality and reliability of CFD results, which will strengthen the confidence in CFD computations by industry. The described E-Learning platform consisting of all basic elements will serve as an “experimental” tool box to get in touch with CFD technology and a communication platform to enable the presentation of results and the communication with experts and mentors. The possibility an E-qualification test will allow to select experts of this specific field. The growing number of qualified experts enables an acceleration of the knowledge distribution.

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DISTANCE EDUCATION USING USER INTERACTIVE REAL-TIME EXPERIMENTS

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Introduction

Presently the automation systems technology learning and training is performed in a classical way mainly. This classical way includes a traditinal form of the combination of practical training as it is performed at nower days' universities. In apprenticeship people get in contact with automation-technology in a very direct way, but with a lack of theoretical background-information.

By transfering theoretical training into the internet combined with a high amount on virtual practical training the problems of the universities concercing less practise and the lack of theory in apprenticeship could be vanquished.

As a result of this the education of the participants is limited by the availability of (several) automation processes to the user to develop their experiences in certain situations.

The availability of a real automation process, which can be controlled via the internet in an interactive way will improve the current classical situation and will serve as the basis of a time and location independent E-learning tool for engineers and technicians.

Fig. 1 presents a sketch of the future automation technology learning and training network. Several Centres of Excellence with expertise in a specific area in this field will collaborate in cluster network. This will offer the developed material (courses, test facilities etc.) to the learner community consisting of people from industry and from universities.

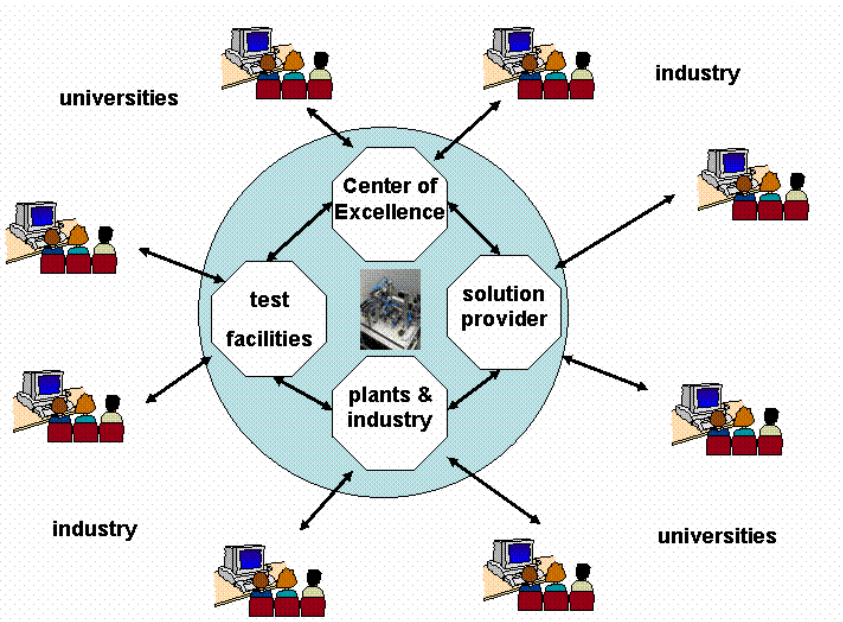

Fig. 1 : Future scenario of distance automation technology learning and taining

Educational and Tutorial Goals

The main envisaged educational and tutorial goals are:

1. Conceptualisation and design of control and automation solutions.
2. Simulation, evaluation and optimisation of existing control and automation solutions
3. Programme validation and debugging, e.g. for IEC61131-3 language
4. Monitoring and parameterisation of given control and automation experiments
5. Co-operation between different disciplines
6. Longlife learning and empirical knowledge distribution

The system users are enabled to perform all the necessary tasks in design, realisation and testing of a control or automation system solution, e.g. a pilot plant for spot welding of automotive components or the distillation apparatus for production of pharmaceutical products structure. The users will be confronted with all predictable and unpredictable events

Requirements of the FHNON-ATC Module

The FHNON-ATC architecture is divided into several modules.

1. Interactive learning-platform
2. Anytime and everywhere accessibility
3. Hybrid environment, real facilities combined with virtual tools
4. Audio-/Video concept
5. Standardised internet infrastructure necessary only
6. Learning modules combining all necessary tutorial items
7. Open architecture system, allowing the docking of further modules

The main element, functioning as operational backbone, is a learning platform, supported by market-available action and perception technologies. This will be ensured by involvement of a thorough multimedia approach including e.g. software-tools and optical devices for virtual reality stations, interactive web-cam and audio performance the users will get a real-like feeling for the tasks they are involved. Tutorial functions, chat-rooms and assistance packages will support them in all phases of learning operation. At the end, a concise evaluation and assessment package will enable them in self-estimation of their educational stage. A parallel running task focusing on careful monitoring and evaluation of pedagogic issues will assist user-focused learning strategies, avoiding too much technical „gimmicks“ and eventually resulting in a lack of understanding and anticipation.

Basic interactive automation control module

Description of the available hardware and software components. Presentation of the example application.

As a first example a controlled cutting apparatus has been built up. The learner has to control the sequential movement of four cylinders. This task will be performed in the following way:

1. The learner will observe the running process and/or will get a description of the process.
2. The learner will write the control software. During this phase he will be supported by information on the application, the software itself and the testing possibilities provided by the software.
3. The learner will send his control program to the real distant control unit via the internet. The control program will be received and stored by the control unit.
4. The learner will steer the control unit by the control module interface presented in Fig. 2.

Fig. 2 shows a controlled cutting apparatus. The process is visualized by WINCC using the web navigator client to observe the process via the internet. On the right the live web cam picture is shown. As a result of this the learner will be able to follow the process by visualized signals from the control unit and the live picture.

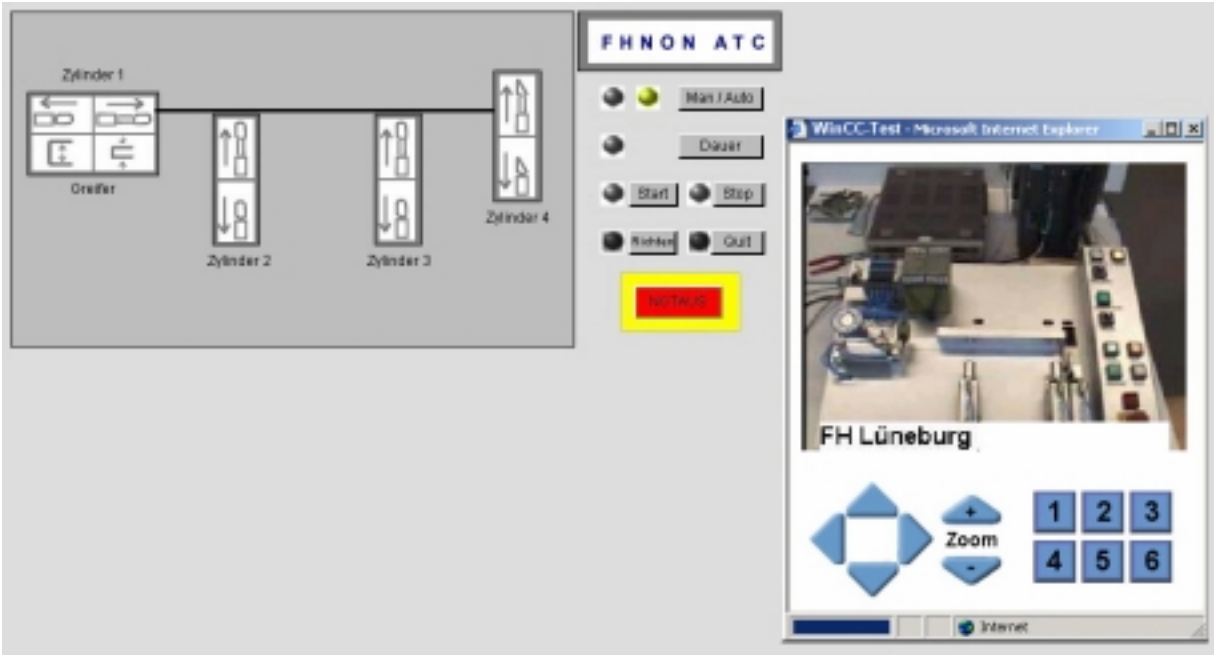

Fig. 2 : Basic automation control module

The described scenario is an example of a complete procedure of analysing, setting-up and carrying out an automation control task. The learner will benefit from:

- the practical application of the control task,
- the provided state-of-the-art material of high practical relevance,
- a time and location independent access to automation control hardware.

In the following period the E-learning material will be developed further. Additionally several hardware processes will be developed to present a variety of applications to the learner.

Distance Education Components to be developed

It has been considered, the following E-learning components has to be developed further in the course of the FHNON ATC project:

- Basic knowledge material updated for e-learning,
- Data base and glossary available for learners,
- Necessary software tools available by download,
- Collaborative learning,
- Web based automatic certification,
- Working groups and interaction with an online tutor.

An automation certification of learners will be necessary, if the platform will used for out of university usage (or probably also within the university). If a more complex process using a more complex control software it may be necessary to build up working groups leaded by an online tutor.

Conclusion

A dedicated learning platform enables easy access and communication for students and teachers as well as enterprises staff, specific multimedia concept elements supporting action and perception issues. A concise pedagogic evaluation and monitoring task is accompanying the technical tasks. Results will enhance not only educational scope, but will also enhance industrial demands on future telelearning and teleservice actions.

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E-LEARNING IN LINGUISTICS: THE VIRTUAL LINGUISTICS CAMPUS

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Abstract

This paper presents the perspectives of teaching linguistics using the web-based learning environment *Linguistics Online*. After a presentation of the main goals, and an analysis of the fundamental didactic aspects applicable to the teaching of linguistics, the basic components of the system will be introduced. The following aspects will be dealt with in detail:

- concepts of virtual education
- concepts of teaching linguistics using the new technologies
- the conception of linguistics online
- the structure of linguistic units at linguistics online

1. The Project

Linguistics-online is a German government financed project running from 2001 to 2003 with the primary goal to make the contents of theoretical and English linguistics at undergraduate level available via the internet. In particular, the following courses will be presented as true online-courses:

Theoretical Linguistics

a. Introduction to Linguistics
b. Seminar: Phonology
c. Seminar: Morphology
d. Seminar: Syntax
e. Seminar: Semantics
f. The Structure of English
g. The History of English

Applied Linguistics

a. Introduction to Applied Linguistics
b. Seminar: Corpus Linguistics
c. Seminar: Functional Grammar
d. Seminar: Psycholinguistics

The project involves three German partner universities with the following responsibilities:

- University of Marburg (theoretical linguistics, implementation)
- University of Essen (applied linguistics)
- University of Wuppertal (didactics and evaluation)

During the developmental phase, all courses will already be fully integrated into the curriculum and simultaneously didactically evaluated and redesigned/reprogrammed in accordance with the didactic recommendations.

2. Linguistics

The realisation of teaching linguistics using the new technologies requires first a precise a definition of the scientific characteristics of linguistics.

1. Linguistics is not taught at school
   Even the most basic concepts and definitions have to be taught at university level. This means that lecturers have to deal with fundamentals for most of their time at the expense of more advanced

concepts. The new technologies are predestined to take over the teaching of the central linguistic aspects thus enabling human teachers to discuss advanced topics with their students either in class or via synchronous modes of e-Learning.

2. Linguistics is an integral component of language studies
   This means that linguistics is not just an isolated subject. Rather, it is an indispensable part of many philologies. Thus, an e-Learning environment of linguistics has to serve a large number of students.
3. Linguistics is internationally standardised to a high degree
   A high degree of standardisation simplifies the development of e-Learning contents. Not only the basic concepts themselves are standardised but also the general structure of the basic courses.
4. Linguistics relies on English as a carrier language
   Since English is the language of linguistics in most publications, any linguistic e-Learning platform ideally uses English as a carrier language, too.
5. Linguistics uses essay-based examination formats
   The standard format of examining students‘ performances is the format of the essay. Since machine-intelligence has not yet reached an adequate level to perform the evaluation of textually unrestricted essays, e-Learning in linguistics necessarily involves a human course instructor who – among other things – evaluates and marks worksheets, essays, and exams.
6. Linguistics examines 'language/speech' and is thus predestined for multimedia applications
   The use of audio material in linguistics is unparalleled in the world of e-Learning (ignoring systems that focus on music). Audio material not only involves spoken commentary but – more importantly – spoken examples of languages, speech sounds, linguistic phenomena, such as stress, intonation, and tone.

These aspects influence the technological parameters applicable to an e-Learning environment for linguistics and determine the general structure of e-learning modules in linguistics.

3. Parameters for a linguistic e-Learning environment

Generally, e-Learning environments can be organised along the following parameters:

- Mode (asynchronous vs. synchronous)
- Location (central vs. decentral)
- Temporal structuring (free vs. fully-structured)

As defined above, linguistics – at least at undergraduate level – focuses on the teaching of fundamental aspects, i.e. basic concepts, definitions etc. The central goals of this early phase of studying the subject is to attain a general level that enables the student to deal with more advanced concepts in a subsequent phase. The teaching of basic aspects does not require extensive discussions or constant queries. Rather, facts have to presented in an unambiguous way. Thus, the central mode of teaching employed in a linguistic e-Learning system, such as linguistics-online, is that of an asynchronous mode. Combined with synchronous tools, such as live-chat or additional asynchronous components, such as message boards, a highly effective way of online-education can be achieved.[1]

The parameter ‚location‘ does not require further explanation. Any serious e-Learning system uses the world-wide web, thus making all components available in a decentral manner.

The temporal structuring of a course, however, needs to be discussed in detail. Ideally, each online-student should have access to all course materials at any time without temporal restrictions. However, at present, the standard student is ‚surrounded‘ by conventional in-class teaching where most courses follow a strict temporal pattern:

[1] The pervious experience with linguistics-online (2000 to 2002), has shown, however, that the use of additional synchronous (chat) or asynchsonous tools (message boards) necessitates the active involvement of the human instructor.

- the general organisation into terms
- the time-schedule of a course within a week

According to our experience, students consider it more convenient to fit online-course into their general time-table: They favour an organisation of online-courses on the basis of conventional in-class courses, i.e. one unit per week. Furthermore, fixed deadlines, e.g. handing-in dates for worksheets or additional course assignments have been found more useful than flexible deadlines. Total flexibility leads to a culmination of course assigments and thus to a heavy work load prior to examinations, whereas fixed deadlines evenly distribute the work over the term. As a consequence, all courses at linguistics-online – at least for the foreseeable future - follow the same pattern:

> Each course consists of 14 units (in accordance with 14 weeks per term in Germany). The units within a course are hierarchically structured, i.e. students start with unit 1 and end up with unit 14, which is - in most cases - the final examination. Each unit consists of an introduction screen where the goals of the unit are defined and of a virtual session which presents the linguistic contents. The virtual session is supported by a question sheet that guides the student through its contents. Having finished the virtual session, the interactive worksheet, the equivalent of a traditional homework, can be tackled.

Needless to say, that any e-Learning system that heavily capitalises on asynchronous ways of teaching should aim at a maximum realisation of multimedial techniques:

- as little text as possible
- graphics support where possible
- animations as visualisations techniques, e.g. for simulation or modelling
- maximum sound support
- interactivity on all levels
- independent web-based training components as integrated modules

4. The State of the Art[2]

Currently, linguistics online is running three courses subdivided into seven groups.

- Introduction to Linguistics (3 groups)
- The History of English (1 group)
- English as a Foreign Language – Methodology (3 groups)

Among the total of 240 students are 20 true online students, i.e. students that do not take part in the optional in-class sessions. Next term, two further courses will be online:

- Semantics
- The Structure of English

The ‘Virtual linguistics campus’, as the system has alternatively been nicknamed, welcomes an average of 90.000 visitors per month and is among the first fully multimedia-based e-Learning systems. It has already realised a maximum of multimedial techniques and has turned out to be a suitable platform for students of English and theoretical linguistics.

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EFFICIENCY INCREASE OF DISTANCE LEARNING BY APPLYING ON-LINE INTELLIGENCE COMPUTER LEARNING SYSTEMS

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Introduction

Since 1999 the distance learning Master's degree studies in "Property Management" has been introduced into the Department of Construction Economics and Property Management at Vilnius Gediminas Technical University and the Master's degree studies in "Construction Economics" from 2000. There are currently 104 master students from all over Lithuania studying in these two distance learning master's programs. During three semesters master's students from 21 modules within the "Property Management" Master's degree Program and 18 modules within the "Construction Economics" Master's degree Program should optionally pass 12 examinations. During the fourth semester master students write a final thesis.

All programme materials are available as printed programme notes which are enhanced, where appropriate, to take advantage of modern teaching techniques and delivery mechanisms. In particular, the following media are used in specific modules: electronic format of the textbooks, video, computer software, computer learning systems, computer conferencing, computer networks, 'face-to-face' contact. The choice of media is often relatively easy to make because for much of the time, local constraints, questions of accessibility and of cost virtually dictate the media through which learners will have to work. Accessibility is vitally important to any learners who have to use self-instructional materials.

The module writers utilised electronic technologies in the preparation of their module material. This assisted the programming team to prepare the material in a variety of suitable formats for dissemination. Once in electronic format the material can be made available in paper format, on CD, over the Internet and by file transfer (FTP). This ensures that the learners can have the material available in the way which best suits their learning needs. Equipment, such as video-recorders and computers are utilised wherever possible. In addition, face-to-face contact, telephone, fax, surface mail, e-mail also used.

Development Prospects of Distance Learning

With the aim of correctly understanding the role of distance learning and its development prospects, it is necessary to investigate the main environmental factors influencing its existence. Various economic, legal, social, technical, technological and political factors force the traditional learning methods one way or another to transform into distance learning. Connected to different changes such as the increased qualifications of the workforce, tough competition, global economy, frequent and significant changes within the markets, the increased power of learners, accelerated moral depreciation of technologies, the increased importance of innovations and modern technologies, it has become necessary to create distance learning.

Competition within distance learning is becoming stronger and stronger and involves more and more organisations. In order to survive in such tough competition conditions, it is necessary to make every effort and aim at creating and offering something better than ones competitors. For example, development of the on-line intelligence computer learning systems, enhancement of the quality of distance learning and reduction of prices, expansion of markets, flexibility in responding to fluctuations of the demand and supply in the market, extension of the range of modules, strengthening of relations with industry, seeking for greater confidence of learners should be included. Also there are some possibilities to increase distance learning efficiency in course module design and structure, development methodology, curriculum structure and content, duration, tutoring approach, learner assessment methods, accreditation system; media and technologies to be used for the development and delivery of the course material; learner support methods and roles of teachers and tutors; information,

dissemination and exploitation plans. This would allow distance learning to satisfy the needs of potential students and increase the number of the loyal and regular life long learning learners.

Economic Versus Multiple Criteria Analysis

Many computer learning systems of distance learning are processing and submitting only economic information for decisions and applying economic models. Alternatives under consideration have to be evaluated not only from the economic position, but take into consideration qualitative, technical and other characteristics. For example, the analysis of a real estate is usually performed by taking into account economic, quality (architectural, aesthetic, comfort), infrastructure, technical, legal, technological, social and other factors. Therefore, applying multiple criteria (intelligence) on-line computer learning systems may increase the efficiency of distance learning.

In order to perform a complete study of the project a complex evaluation of its economic, technical, qualitative, technological, social, legislative, infrastructure and other aspects is needed. Quantitative and conceptual descriptions provide this information. The diversity of aspects being assessed should include a variety of presented data needed for decision-making. Therefore, the necessary conceptual information may be presented in numerical, textual, graphical (schemes, graphs, diagrams and drawings), equation formats, audio or as a videotape. The criteria used for conceptual descriptions, their definitions and reasons for choice of the criteria's system, their values and weights also should be analysed. Conceptual information about the possible ways of doing a multi-variant design is needed to make a more complete and accurate evaluation. Quantitative information is based on criteria systems and subsystems, units of measure, values and initial weights of the projects' alternatives. Conceptual information is a more flexible and less accurate means of expressing estimates than numbers. Quantitative information is more accurate and reliable and allows one to use multiple criteria decision-making methods.

The application of multiple criteria on-line computer learning systems developed by the authors in the teaching process creates conditions for students enabling better mastering of many disciplines and better understanding of their mutual connections. Using methods that are suggested by authors can quite successfully solve this task:

- A new method of complex determination of the weight of the criteria taking into account their quantitative and qualitative characteristics was developed. This method allows calculation and co-ordination of the weights of the quantitative and qualitative criteria according to the above characteristics.
- A new method of multiple criteria complex proportional evaluation of the projects enabling the user to obtain a reduced criterion determining complex (overall) efficiency of the project was suggested. This generalized criterion is directly proportional to the relative effect of the values and weights of the criteria considered on the efficiency of the project.
- In order to find what market value will make an project being valued competitive on the market, a method of determining the utility degree and market value of projects based on the complex analysis of all their benefits and drawbacks was suggested. According to this method the projects utility degree and the market value of an project being estimated are directly proportional to the system of the criteria, adequately describing them and the values and weights of these criteria.
- A new method of multiple criteria multi-variant design of a project's life cycle enabling the user to make computer-aided design of up to 100,000 alternative project versions was developed. Any project variant obtained in this way is based on quantitative and conceptual information.
- An original model for a complex analysis of a project's life cycle enabling the user to analyse a project's life cycle and its stages, the parties involved in the project as well as its micro and macro environment as an integral whole was developed.

The methods are intended for alternatives in planning, multiple criteria analysis, determining the degree of utility and market value and selection of the most efficient versions. Based on the analysis of existing computer learning, information, expert and decision support systems, some distance learning systems consisting of a database, database management system, model-base, model-base management

system and user interface were developed. In order to demonstrate the application of the above methods a few multiple criteria (intelligence) computer learning systems will be considered below as examples.

Increase of Students' Study Efficiency by the Application of Multiple Criteria Computer Learning Systems

Application of multiple criteria computer learning systems allows one to determine the strengths and weaknesses of each project and its constituent parts. Calculations were made to find out by what degree one version is better than an other and the reasons disclosed why it is namely so. Landmarks are set for an increase in the efficiency of project versions. All this was done argumentatively, basing oneself on indexes under investigation, on their values and weights. This saved students' time considerably by allowing them to increase both the efficiency and quality of distance learning.

Below is a list of typical problems solved by graduates in their course and diploma projects:

- Multiple criteria analysis and determination of market value of a real estate (e.g. residential houses, commercial, office, warehousing, manufacturing and agricultural buildings, etc.).
- Analysis and selection of a rational real estate version.
- Multiple criteria analysis and determination of the highest and best use of a real estate.
- Determination of efficient investment instruments.
- Determination of efficient investment projects.
- Determination of efficient financing instruments.
- Multiple criteria analysis of a property's obsolescence
- Alternative design of a project's life-time process (i.e. one-family dwelling houses, agricultural buildings, cast-in-place buildings, prefabricated panel buildings, refurbishment of buildings, etc.), its multiple criteria evaluation, determination of utility degree and the selection of the most efficient version.

The use of multiple criteria computer learning systems in solving various problems encountered in the course and diploma projects was also aimed at determining:

- Students' knowledge acquired at the university,
- Student's general level of education,
- Student's keenness of mind,
- Student's ability of fast and adequate response to changing situation.

Development of the On-Line Intelligence Computer Learning System

Technological innovation mainly through the development of Internet technology combined with intelligent computer learning systems (i.e. calculators, analyzers, software, experts and decision support systems and intelligent agents) have provided, by a variety of new opportunities, a new breed of distance learning. A large number of various purposes for computer learning systems can be found on the Internet. However, all these calculators, analysers, software, expert and decision support systems and intelligent agents are not connected into one integrated on-line distance learning system. Each of them is designed to solve a specific task. There are some possibilities of their integration on the module basis and their management by using a model management system.

According to the user's needs, various models may be provided by a model management system. When a certain model (i.e. search for alternatives) is used the results obtained become the initial data for some other models (i.e. a model for multiple criteria analysis and setting the priorities). The results of the latter, in turn, may be taken as the initial data for some other models (i.e. determination marker value, etc.). Following those ideas already mentioned and other ideas, the authors developed a Construction Products Multiple Criteria Computer Learning System.

At the present moment the developed System allows the performance of the following functions:

- Search of construction products. A consumer may perform a search of alternatives from catalogues from different suppliers and producers. This is possible because the forms of data submitted are standardized into specific levels. Such standardization creates conditions that can be used by special intelligent agents who perform a search for the required construction products from various catalogues and gather information about products. One or several regions may limit such a search.
- Finding alternatives and forming comparative tables. Consumers specify their requirements and constraints and the System queries the information of specific construction products from a number of online vendors and returns a price-list and other characteristics that best meets the consumer's desire/needs. The System performs the tedious, time-consuming, and repetitive tasks of searching databases, retrieving and filtering information, and delivering the information back to the user. Results of a search for specific construction products are submitted in tables, which may include direct links to a Web page of a supplier or producer. By submission, such a display of the multiple criteria comparisons can become more effectively supported. The results of the search of a concrete construction product are often provided in one table where one can sometimes find direct links to the Web page of the supplier or manufacturer.
- Evaluation stages of alternatives (i.e. multiple criteria analysis of alternatives and selection of the most efficient alternative). While going through the purchasing decision process a customer examines a large number of alternatives. Each alternative is surrounded by a considerable amount of information (e.g. price, discounts given, thermal insulation, sound insulation, rate of harm to human health of the products, aesthetic, weight, technical specifications, physical and moral longevity). Following on from the gathered information the priority and the alternative's degree of utility is then calculated. The degree of utility is directly proportional to the relative effect of the values and weights of the criteria considered, on the efficiency of the alternative. This helps consumers to decide what product best fits their requirements.
- The after-purchase evaluation stage. A consumer evaluates the usefulness of the product in the after-purchase evaluation stage.

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INNOVATIVE E-LEARNING EXPERIMENTATIONS BY USE OF WAHEEB A TUNISIAN PLATFORM

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Abstract

In Tunisia, the development of on-line courses and concrete e-learning experimentations are very rare and yet unexplored [AB99]. In this context, the e-learning team of the Higher School of Sciences and Techniques of Tunis (ESSTT) worked since several years on two aspects: pedagogic and research. The object of this paper is to present experiences and works carried out by this team, especially the pilot e-learning experience recently done by use of the Tunisian e-learning web-based platform Waheeb, and team reflections about the concept of intelligent e-learning system.

1. Pedagogical aspect

Believing that e-learning is different from classical learning and that needs a new pedagogy which takes in consideration the new situations and tools of learning and teaching, the ESSTT proceeded, via a collaboration Tunisian-Canadian project, to acquire the Canadian platform Theorix for e-learning. This project allowed to train some teachers in numeric pedagogy and production of multimedia courses to diffuse them via Internet. This project allowed to do first experimentation of these new methods of web based teaching. The team of e-learning, constituted mainly by those teachers, contributed in the design of the first Tunisian e-learning platform called Waheeb [CJ02].

Effectively, at the beginning of 1999, Waheeb started as an academic prototype of an e-learning system designed and developed in order to have a pedagogical framework adapted to the Tunisian context and its learning system. Furthermore, at the beginning of 2000, e-com-soft, a Tunisian start-up, adopted the project and took the role of promoting and commercializing it. E-com-soft have worked and continues to work in collaboration with our research team to produce a professional and robust e-learning system that allows colleges and universities, corporations and commercial education providers to bring their academic, administrative, community and other educational services on-line.

1.1. Waheeb description

Waheeb is a Web-based learning platform that provides a fully integrated student environment, learning management system, and a range of custom content creation and publication tools. The goal of Waheeb designers is double: a general goal which is the contribution of the evolution of e-learning by the development of efficient system, rich in functionality and tools who assist users, especially teachers by means of high level Learning Content Services (LCS). Thanks to this LCS, teachers can create multimedia contents, integrating text, images, video, animations,… without requiring HTML programming. The second goal, which makes the originality of Waheeb, is specific : it's related to Arabic language. In fact, due to the unavailability of complete Arabic e-learning platforms, the objective was the development of a platform which can be used completely in Arabic, of course in addition of other languages such as English and French.

Waheeb offers three modes of use reachable via a Web navigator.

1.1.1. Student mode:
student can learn accordingly to his appropriate rate of comprehension. He benefits of a set of tools that assist him during his learning process. The system lets him navigate freely in the course structure, download and print documents, communicate with his colleagues and teachers (an intern e-mail function), plan and organize his learning, homework and exams (calendar function), participate in a forum which is related to his course and animated by a teacher to share ideas and opinions with the

virtual classroom, to take personal annotations, to discuss directly with his colleagues (chat function), to do interactive auto-evaluation exercises and to submit evaluation and works to his teachers.

1.1.2. Professor mode :
Professor benefits of a complete set of tools for content creation. It allows him to integrate any kind of material (text, image, video, flash animation, Java applets…) and hyper links to internal pages of the course or to extern Web sites. Those tools allow an easy production of high quality pedagogical material. In fact, the system doesn't need any HTML or programming knowledge. In addition, this mode offers to the teacher a complete set of tools for communication (e-mail, chat, forum, calendar), tutoring and evaluation of his students.

1.1.3. Administrator mode :
the task of the administrator is the management of the system users : students and teachers. He defines for each one his access rights and accords to him authentification login and password. He has to manage on-line registration of students in addition of the administration and the control of course sites that teachers realized.

The advantage of Waheeb, among others, is its richness of functionality for the three modes, its simplicity of use and its uniform environment presentation of courses. Finally, Waheeb gives more importance to social contacts of virtual class: students are allowed to edit and consult their profiles and personal pages.

1.2. Pilot experience

In order to explore the different aspects of this new mode of teaching and to analyze how it can be efficiently realized, the e-learning team proceeded to realize a pilot innovative experience of e-learning in Tunisia. It developed two courses of MS-Word and MS-Excel and started teaching a group of 130 students of the first year of computer science bachelor. The courses were developed by teachers with the help of two specialists in multimedia to treat images, audio and video sequences and to prepare flash animation and Java applets.

The group of the 130 students was divided into 8 groups of 16 students. All students received 8 hours training in operating system and 2 hours training in the use of the platform Waheeb.

Indeed, the team had to choose between the two platforms Waheeb and Theorix. The choice was Waheeb platform for many reasons. The most important of them were :

- **Simplicity using :** Waheeb offers an interface which can be easily used and based on three modes : student, professor and administrator whereas Theorix is based on five modes : system administrator, client administrator, author, facilitator and student.
- **Uniformity :** Waheeb presents all courses in an uniform way based on standard template with navigation tools and communication and customized functions.
- **Richness of functionality :** Waheeb is a three-language platform : Arabic, French and English, it has its own communication tools (e-mail, chat, forum, …). At any moment, a student can be able to know who from his colleagues is connected and can, then, contact him.
- **Richness of the evaluation tools:** Teachers can produce exercises in multimedia format and can interface them with any software related to the course.
- **Inter-operability (import/export tools) :** Waheeb can host contents created with standard HTML editors or other platforms. The contents created with Waheeb LCS can be, also, exported in HTML format and hosted in other platforms.

Finally, disposing of the source program of the platform was also an other reason to choose Waheeb system. In fact, thanks to this, we have the possibility to obtain all kind of data related to the use of the platform (i.e. time connection to a course, last date of connection, number of tentative before a right answer, …). This data is used therefore by the team for both pedagogic strategies and research.

1.3. Evaluation of the experience

We note at first, that the experience, started at the beginning of November, is not yet concluded (it will be ended in the few forthcoming days). To evaluate this experience, we plan to perform two kinds of analysis :

- Statistical analysis of data delivered by the platform : our object here is to know the rate of the use of tools and resources and to constitute eventually relations between the relevant criteria and aspects of e-learning such as the use of a particular tool and time of connection or number of visits…
- Analysis of users appreciation : questionnaires will be distributed to both students and teachers in order to obtain their appreciation about different aspects. For students, questionnaires will focus, particularly, on the facility of using the platform, course's structuration, communication, … Whereas, for teachers, the questionnaires will concern two points of view: the pedagogic strategies and quantification of efforts required for this new learning and teaching mode, such as time of content creation, time spent to communicate with students (respond to e-mails, Chat, forum animation) and time needed to correct assessments.

Even if the experience is not yet fulfilled, we can enumerate some positive points :

- Elimination of psychological barrier : students can ask questions and do pretests without the hesitation and the inconvenience of classical situations.
- Discrete contacts : student can freely communicate with his teachers or colleagues via e-mail or chat.
- Personal annotation : indeed courses are available, students can take annotations and remarks which they find pertinent.
- Possibility of feedback : students can review all notions at any time.
- Respect of individual rate : every student can learn at his appropriate rate.
- Amelioration of pedagogical methods : teachers benefit of environment providing sophisticated LCS to produce contents of high quality.
- Permanent availability of courses : teachers invest once in course production, furthermore they concentrate in their main task (i.e. teaching, helping and tutoring students.)
- Flexibility of teaching schedule : the constraints of scheduling traditional teaching and training are eliminated.

2. Research aspect

To our knowledge, actual platforms are systems that benefit and exploit new opportunities of Web technology and networks becoming more and more efficient and performant. Those systems are focused on pedagogic aspect of training and teaching (creation and diffusion of courses, preparation of exercises, …) and the use of communication tools to teach or assist students. However, those systems are unable to detect the level of students, their weakness and difficulties they meet. Furthermore, they are unable to react with students and to propose to them solutions to fix their problems. This is certainly due to the evaluation systems used in most e-learning platform which just permit the student to do interactive exercises of kind QCM or associations or, in the best case, open questions that he has to do and submit to the teacher.

In fact, we believe that efficient use of new technologies of information and communication for learning and teaching needs more than a performant system which gives its users technological tools [DL00]. It needs intelligence to be adapted to the new situations of learning. In this context, the object of the works of the team is the design of techniques, approaches and tools able to grief intelligence in e-learning systems to guaranty their best results. Particularly, the reflections are focused on these points:

- Automatic detection student level (before e-formation)
- Detection of particular student weakness (during the e-formation) after the analysis of his answers to exercises and pretests and eventually the possibility to propose to him an adequate performance program.
- Individualization of student formation program.

Our vision of such system is mainly based on the elaboration of dynamic questionnaire generator to compute student level. This generator performs calls, at any step, to an intelligent analyzer of answers to decide the next question to propose. The level computed will lead afterward to generate automatically, for every student, an appropriate training program. This vision affects the course design and requires a new approach for structuring formation.

Conclusion

In this abstract, we have presented works done by the team of e-learning of the ESSTT. Those works concern both pedagogy and research. Particularly, we have described the pilot experience of e-learning and our reflections about intelligent e-learning system. In the full paper we will give the detailed description of the evaluation of the experience.

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THE NEED FOR GLOBAL CONFORMANCE PROGRAM FOR E-LEARNING TECHNOLOGY

Kevin Riley – Director, IMS in Europe

Introduction

This paper highlights the need and resulting benefits of constructing a coordinated, global conformance program to ensure interoperability of e-learning goods and services. It then goes on to describe initial efforts already underway to establish such a conformance program, in collaboration with key players and communities around the world.

Conformance Testing

Virtually everyone will, in some aspect of life, rely upon recognition of a brand or trademark in making a purchase decision at some time or other. This applies just as much, if not more so, to software, information services and multimedia content as these goods have the added feature that they are 'experience goods,' i.e. in order to evaluate them, the user needs to have already made a purchase so that they can experience using the product. Suppliers attempt to address this issue for potential purchasers by providing information through advertising, trial versions of the software and distribution (often from a web-site) of detailed technical specifications. In spite of these efforts on the part of vendors, there is still a significant market for independent third parties, offering comparative reviews of similar products and generating revenue from a mix of advertising and/or cover price (e.g. in the case of magazines).

All of the above activities are aimed at persuading, or helping the prospective purchaser to determine the **fitness for use** of the product in terms of its functionality and utility to the purchaser.

For technology-based products, there is often a further dimension resulting from the requirement that compatibility or interoperability is assured with complimentary products, possibly offered by other vendors. Given the technical nature of the products in this category, it is unrealistic to expect the prospective purchaser to evaluate products to a sufficient level of detail. A widely established solution to this problem is that vendors adopt a common specification or standard and apply a trademark indicating their successful conformance to this standard. The standard may be based upon a technology implemented by a powerful supplier in the market. However, new technology developments are often driven by consortia comprised of key players, who collaborate in constructing a specification, which can then be used by all. In either case, the outcome is a **technical specification,** which all developers can adopt in pursuing interoperability with each other's products.

For the user community, the valueis less the specification, than a corresponding **conformance program**, which governs and polices the trademark indicating conformance has been achieved. For obvious reasons, such a conformance program is normally administered by a trusted third party organization, that is able to deal with vendors in an impartial manner. There are some common features of such conformance programs:

- The conformance program offers a trademark, which is recognized by purchasers and therefore valued by vendors and relates to a relevant technology specification;
- Conformance must be measurable against clearly specified criteria;
- Testing related to conformance must be subject to QA procedures to ensure consistency in their application and interpretation of test results.

Examples of technologies, which are implemented across vendor's products and subjected to some form of independent scrutiny, fill our everyday lives. It is a testament to their success in achieving interoperability between complimentary products that we spend so little time thinking about them.

e-Learning Conformance Testing

Not surprisingly, as the e-learning industry has developed, similar needs have emerged and initiatives launched to address these. E.g.

- IMS (http://www.imsglobal.org) is producing a growing number of specifications whilst collaborating with leading communities and vendors in developing a global conformance program.
- MERLOT (http://www.merlot.org) is a US-based HE consortium by which tutors can exchange online content which is subjected to peer review to gauge its fitness for use.
- AICC (http://www.aicc.org) have generated CBT specifications and operate a certification scheme for conforming content.
- ADL (http://www.adlnet.org) have produced their SCORM specification whilst constructing a pilot test suite with which to test conforming content.
- SIF (http://www.schoolsinterop.org) have developed a specification for schools administration systems and plan to launch a related testing service for vendors in the US.

From the present experience of adoption of IMS specifications, it is clear that it is not a case of one size fits all. Various communities are taking the IMS specs as a core, which they then adapt to meet local need through:

- Extension - e.g. creating additional data elements and/or fields to support local functionality;
- Translation - re-implementation in local language;
- Adaptation - replacement or extension of vocabularies and their data structures to match local practice.

Given how rooted education is in culture and language, this should come as no surprise. In Europe, harmonization is proceeding across many fronts, most notably with the recent introduction of the single currency. But education remains a preserve of the member states.

The IMS Global Conformance Program

The IMS Global Learning Consortium has recently focused its attention upon putting in place a conformance program by which to evaluate the growing number of e-learning products, which claim to implement the IMS specifications. Membership of IMS is comprised of system vendors, publishers, and government agencies from around the world. With this cross-section of players in the marketplace and its global reach, IMS is an attractive vehicle by which to develop a conformance program able to:

1. Identify underlying core e-learning technology which has global applicability;
2. Address the need or local adaptation in terms of extensions to core data models, utilization of regional vocabularies to reflect local practice and implementation in local language.

There are thus a number of communities (acting collectively as Conformance Authorities), who might seek to offer conformance assurance against their own criteria for implementing the IMS specs, e.g.:

- Government agencies responsible for national education and training;
- Global corporations and consortia wishing to harmonies corporate training worldwide, say in a particular domain;
- Public sector communities (e.g. healthcare, military).

In turn, participation in a common Conformance Program not only ensures focus on the growing number of specs being adopted, but also offers significant economies of scale in terms of implementation of the common core of any test capability.

Benefits the IMS Conformance Program

Conformance Authorities

- Sharing cost of developing the conformance program and test suites;
- Reducing the cost of local testing by sharing test suites and program tailoring;
- Encouraging vendors to provide high quality, conformant products across markets.

Suppliers

- Advantage over competitors who are not compliant
- Reducing the cost of conformance;
- Encouraging buyers to set consistent conformance requirements and testing procedures.

Fund-Holders and Purchasers

Ultimately, the real measure of the effectiveness of the Conformance Program will be the degree to which it addresses the needs of the purchasers and users of this technology. From their perspective, the Conformance Program should:

> Reduce the risk and cost to educational institutions, government and commercial educators in deploying distributed learning systems and content*, by ensuring interoperability between *conforming* content and *conforming* distributed learning products.

* N.B. In this context, content may refer to instructional content, assessments and accreditation data (e.g. competency/learning objective models).

If this objective is met, then there will be greater confidence in committing funds for online learning as purchasing requirements will be more clearly defined and understood and future-proofed at least in the short to medium term. This can only act to increase the demand for online learning products and services, to the benefit of suppliers and those defining corporate, national or sector policy in this area.

Structure and Operation of the IMS Conformance Program

IMS is currently recruiting interested parties to participate in the initial planning phase for conformance. A key task for this phase will be to explore alternative approaches to the structure and high-level operation of the program. The following outlines some key functions and responsibilities to be addressed for conformance within the context of IMS core specifications whilst also servicing local extensions. The planning phase will refine how these functions can best be implemented as a cohesive program.

Consider converting these bullet lists to paragraphs. The non-parallelism of them makes them awkward.

IMS Conformance Committee

- Stakeholders in conformance constitute the IMS Conformance Committee (CC) to share development of a consistent overall conformance program, core test suites and tools for testing
- The CC facilitates development and sharing of local extensions and application profile test suites
- CC registers users and protects the integrity of core program, test suites, and certification logo or trademark.
- CC evolves and maintains core program, test suites, and tools

Conformance Authorities

- Conformance Authorities (CA's) may be independent government, professional, or commercial bodies with specific technical, policy, or other conformance requirements
- CA's collaborate via CC to define and manage a common conformance policy, core test suites, and conformance program

- CA's register all localization or application domain extensions to a shared repository maintained by CC
- CA's authorize and supervise administration of conformance tests
- CA's may cooperate via the CC to develop test suites for extensions

Testing Organizations

- CA's (or authorized 3rd parties) conduct conformance testing
- Administer conformance tests using core and extension tests
- Report test results for certification purposes
- Provide testing data to CC for quality assurance of conformance program
- The ADL SCORM reference model provides an alternative scenario of a localization case. SCORM exploits a number of IMS specifications, which are adapted to address the needs of the military community. In fact, the ADL technical team are active participants within IMS and, along with the MIT OKI, are collaborating with IMS on a common architecture. With the growing number of military procurements for e-learning services which make reference to SCORM, there is a clear need for a mechanism to measure conformance for this distinct community. However, much of the underlying technology is common with other communities exploiting the IMS specifications. Recognizing this synergy with the needs of other communities, the ADL have committed to participation in the IMS Conformance Program and are making the SCORM pilot test suite available to the program as a starting point for testing.

Conclusion

The stage of e-learning technology development, combined with the growing scale of procurements which are intending to utilize these technologies seem to confirm that it is timely to be putting in place a conformance program which can aid suppliers and purchasers alike in ensuring interoperability of goods and services on offer. The general principles behind such conformance programs have been outlined, along with some of the key requirements, which are specific to the e-learning community. Principally, these embody the desirability of utilizing pervasive, core underlyingtests and testing procedures across the globe to exploit economies of scale and ensure choice in the marketplace, combined with regional/sector specialization to address cultural, linguistic and custom constraints. A perspective on the possible structure and operation of a conformance program have been outlined, based on discussions involving participants from ADL, AICC, MERLOT and SIF, along with key vendors and user communities around the globe.

The IMS would welcome input, feedback and direct participation from organizations interested in conformance and from government agencies with particular responsibilities for policy formation or procurement management in this domain.

e-Learning Market Projections

To give some indication of the scale of this sector over the next few years, below are some indicative figures drawn from recent surveys of the e-learning domain.

IDC estimates that over half of all corporate e-learning expenditure is spent on content development. The US e-learning market for 2001 was estimated by IDC to be $4bn. Expenditure on online learning in the UK would reach £59m in 2001 and by 2004 IDC estimated that this would rise to £311m. Corporate customers will account for much of this spending, attracted by the flexibility and savings that can result from well-designed e-learning systems. The breakdown of e-learning expenditure by IDC is estimated to be broadly 53% content, 12% delivery, 35% services.

According to Keynote Research the corporate e-learning market in the UK would be £148m in 2001, £286m in 2002, £550m in 2003 and £1bn in 2004. This is a 93% annual compound growth rate.

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QUALITY-RELEVANT DATA IN THE CONTEXT OF E-LEARNING APPLICATIONS

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Introduction

In this work we'll present an overview of all the quality-relevant data occurring in the context of e-learning applications. This compilation may be used as a basis for the modelling and implementation of quality information systems within the scope of e-learning. In the following firstly we'll have a look on the state of the art related to this work. Then we'll present different types of quality-relevant data, which should be the principal constituents every quality information system for e-learning applications should have. Afterwards we'll close with a conclusion and an outlook.

The results presented in this work have been obtained in the context of the research project "ViKar – Virtual University Group Karlsruhe" (ViKar, 2002). This project is being financed by the state of Baden-Württemberg as a part of the research program "Virtual University of Baden-Württemberg" (VHBW, 2002).

State of the Art

In the last few years a lot of endeavours have been made in the following two fields of e-learning research and development:

Authoring of e-learning materials: As a basis for all e-learning activities contents have been developed in great quantities. Since special programs for this purpose have been missing, in many cases the authors used well known software, e. g. for word processing, creation of slide presentations, or designing of web content. The most important disadvantage of this approach is that these products don't support special requirements for the authoring of e-learning materials. Thereby it's hardly possible to support quality management concepts using these tools. Nevertheless special concepts for the designing of e-learning contents have been developed. For example a process model for the development of virtual learning materials has been presented in (Klein & Stucky, 2001). The authoring of learning materials according to such a model can be the basis for a quality management in the context of e-learning.

Platform development: To provide e-learning materials to the learners and for the handling of communication and organizational affairs a lot of e-learning platforms have been developed. An overview of only the most important ones can be found for example in (Landon, 2002). The comparison of such e-learning platforms shows that there are wide differences in their functionalities, but nearly all of them have one in common: they provide more or less features that may be useful for quality management, but usually they don't force or support a continuous quality management in their workflows.

An important problem for the quality management in the context of e-learning is that there is a gap between the authoring tools used for the development of e-learning materials and the e-learning platforms. Many of the platforms don't support the authoring or have only rudimentary functionalities for this purpose. Therefore the authors have to use tools widely independent from the platforms, and this makes it quite difficult to implement quality information systems, which can be used both from the authors and from the providers of e-learning materials. Furthermore standards for the modelling of e-learning content such as LOM (IEEE Learning Technology Standards Committee, 2002) are not used widely enough so far. For this reason concepts for a continuous quality management in this connection are missing generally.

Quality-Relevant Data

In this chapter we want to generate a complete compilation of all the quality-relevant data in the context of the development and the usage of e-learning applications. In this connection we regard data as quality-relevant, if it can be used to obtain information about the quality of an e-learning application. Below we'll follow a classical waterfall model for software development and we'll look for quality-relevant data in each of the phases in this model. Our considerations do not depend on this special model – the usage of others would essentially lead to the same results. An overview of the different types of data described in the following can also be found in Figure 1.

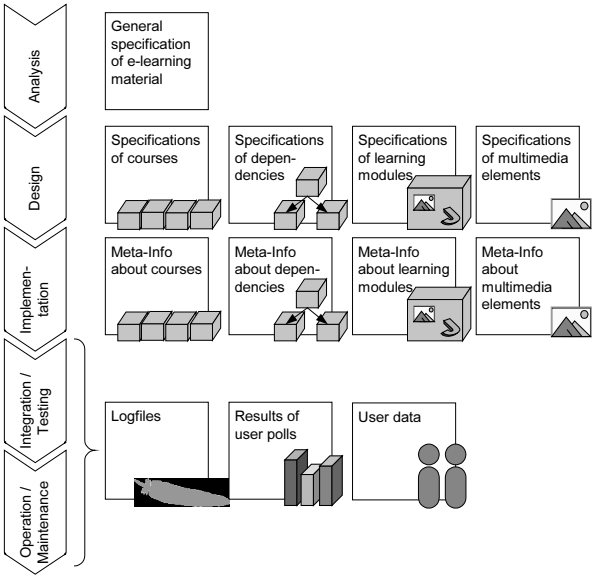

Figure 1: Quality-relevant data in the lifecycle of e-learning applications

Analysis

As the result of the analysis phase general specifications of the planned e-learning application are generated. For example the subject of the application and its target group are usually defined in this phase. It's reasonable to specify such information in a formalized way in order to simplify a later automatic processing. The specifications will be stated more precisely in the following phases.

Design

In the design phase the e-learning application is modelled in detail. The information generated in this phase is very important for a later quality control, since it is obviously much more adapted for an automatic data processing than the implemented e-learning contents itself. In the design phase data can be generated in the context of the following activities:

- *Modelling of the course content:* The content which should be imparted in the whole course should be specified in a suitable way. Moreover it has to be defined, which previous knowledge can be assumed to be known.
- *Modelling of the course structure:* The division of the course content into modules is defined here. Therefore the contents of the individual modules and the relationships of their contents are specified. These relationships may be dependencies of the contents, a particular hierarchical structuring, or just planned hyperlinks between the modules.
- *Modelling of learning modules and their multimedia elements:* For each learning module a detailed specification should be generated before the implementation phase. Especially important for example is the segmentation of the content into modules. Technical requirements for the usage of the module or special multimedia elements should be specified, too. As special learning modules also exercises and tests can be specified in this phase.

All the information mentioned above should be specified in a formalized way. The specifications of multimedia elements, learning modules, their dependencies, and specifications of the whole courses should be stored as quality-relevant data. In later phases this data can be used to survey, whether the implemented e-learning application does suit its specifications or, as another example, if it's used in a way according to them.

Implementation

Pursuant to the modelling in the preceding phases the e-learning application has to be implemented here. During the implementation of multimedia elements, learning modules, and the whole course the corresponding specifications should be transformed into the meta information of each element. In this context the specifications of the earlier phases could be stated more precisely and may be modified if necessary. Of course also the meta information has to be quoted in a formalized way in order to process it automatically later. If for example the learning modules are written using XML some special tags for the described meta information should be used.

At this point it should be mentioned that also the learning content itself is quality-relevant of course. But since it's not as accessible for an automatic processing as its formalized meta information, it's not reasonable to store the whole learning content in a quality information system. Instead of this only some structural information within the content should be taken into account. For example the hyperlinks between learning modules should be specified as meta information in order to survey that hyperlinks don't lead users with a certain previous knowledge to modules which are not understandable for them. Furthermore such structural information about the learning content is relevant for a later analysis of user activities.

Integration and Testing / Operation and Maintenance

In models for software development usually it is differentiated between the phases of "Integration and Testing" and "Operation and Maintenance". We won't do that here, since no completely new types of quality data will occur during the integration of e-learning applications and everything that can be done during the testing phase could be done in the operation phase, too. Therefore it's sufficient to analyze the phase of operation and maintenance in detail.

The different types of quality data mentioned in the following have one in common: since the user is involved in the generation of this data, his privacy has to be taken into account. For example all the personal data in a quality information system has to be anonymized or at least pseudonymized. Some hints to techniques respecting at least the German data protection acts can be found in (Schaar & Möller, 2002).

Appropriate technologies have to be used in all of the following activities of the operation and maintenance phase:

- *User tracking:* While the learners are using the modules, theoretically everything they do could be logged. This so called user tracking data can be interpreted as quality information in many ways. When for example a user has tried to access an unavailable document this should be logged in order to fix the problem at least manually. Beside such obvious techniques also more elaborated ones are possible: if for example many users coming from the same module search for a certain word in the glossary, this might indicate that the learning module is ambiguous at a certain point or that some knowledge the learners don't have has been presupposed.
- *Questioning of users:* A simple way to get quality information is the direct questioning of the users. There are different types of such user polls: for example the users could be asked to fill out a web form after using an e-learning course. Another example is a feedback function, which can be used by the learners in every learning module in order to rate it.
- *Assessment of users:* Also the results of learner assessments can be useful for the evaluation of an e-learning course. Essentially two different types have to be distinguished: official examinations executed by a university or another e-learning provider and self assessment of the learners.

- *Administration of personal user data:* For the interpretation of the data generated during the other activities described in this paragraph some personal data of the users can be useful. That does not mean that we want to use the information system containing the learners' personal data as a part of a quality information system. It should only be possible to import some statistical data about the learners into the quality information system in an anonymized or pseudonymized format.

Conclusion and Outlook

As described in this work there are many different types of quality data occurring in the context of e-learning. To obtain a quality information system, which is usable during all phases of an e-learning application's lifecycle, all the relevant data should be stored in one information system. Of course such an information system could be implemented in a distributed way, but a consistent and co-ordinated data model is absolutely necessary. The work in this context has been made difficult because of the described separation of authoring tools and e-learning platforms. A solution to bridge the gap between these different software systems could be the usage of standards for e-learning content like for example LOM (IEEE Learning Technology Standards Committee, 2002).

Further interesting problems will appear in the context of the analysis of quality data. Some existing approaches could be transferred from the field of the evaluation of web content in general or for example e-commerce web sites in particular. Nevertheless also special concepts for the quality management in the emerging area of e-learning are being developed to achieve a really higher quality of e-learning materials. Information systems containing all the quality-relevant data can be the basis therefore.

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A METHOD TO AUTOMATICALLY RECOMMEND COURSE ALTERNATIVES IN THE WEB-BASED COURSE BROKER CUBER

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Abstract

The EU-funded project CUBER strives to develop a web-based course broker facility where prospective students can inform about study programs offered by the CUBER partners. As these students might want to tune existing programs to their interests, course alternatives should be offered by the system to support this tuning. To do this, the CUBER systems needs a mechanism to automatically derive whether two courses can be exchanged in a program or not. We report on our achievements towards this mechanism.

Introduction

Prospective students currently find information about study opportunities on the internet either at institutions´ web sites or in collections provided by third parties. The former have the disadvantage that many sites have to be visited in order to get an overview of the market. The latter have the disadvantage that the information often is incomplete or not provided at a sufficient level of detail, e.g. which courses exactly comprise a study programme.

The CUBER project [1], funded by the European Commission under the IST-programme in the 5th framework, strives to develop a web-based facility where institutions themselves provide information about their study programme at a level of detail that comprises meta-data of single courses. The prospective student can search this information to find courses or study programmes satisfying his needs and interests. The CUBER consortium comprises distance teaching institutions and conventional universities of all over Europe.

Often a prospective student is not satisfied with a study programme as it is offered. He might want to exchange a particular course in that programme against a course that better suits his interests and needs. However, that course might only be offered by another consortium member. So the question arose whether the student can receive a recommendation by the system whether this exchange is possible. This recommendation should naturally not be based on static exchange tables, as these would be too cumbersome to maintain. In the sequel, we will report about our approach to solve this problem.

Automated Course Exchange

The goal of CUBER´s Workpackage 9 "Credit Point System Integration" is the automation of course acknowledgement. Consider the situation of a student planning to enrol into a study programme, who wishes to exchange a course A of his programme against a course B by another provider that better suits his particular interests and needs. Currently, the student requests this exchange at his local administration. The request is granted or denied after some administrative process which takes weeks or even months.

Requests of this kind also happen when a prospective student is tailoring a programme offered to him by the CUBER system. In this case, however, a decision has to be done by the system as the student expects an immediate response. A similar kind of request happens if a prospective student requests acknowledgement of courses he has already completed successfully in a previous study. An immediate answer is necessary here as well in order to enable the student to guess his total workload to complete the programme offered to him by the CUBER system.

Note, that the above “decisions” are not binding for the institutions involved. Therefore they might be considered a best effort guess. On the other hand, this guess may only differ from the institution´s final decision in very peculiar instances, in order not to risk acceptance by the system´s users.

In order to find out to what extent course acknowledgement can be automated, we first looked for an existing system that:

- is recognized at least all over Europe;
- is used in practice on a large scale;
- allows transfer and acknowledgment of study success internationally.

The only system implementing these points is the European Credit Transfer System ECTS [2]. While ECTS does not allow automatic acknowledgement of courses, the process is strictly formalized. Furthermore, ECTS provides an established and unified "currency" for course extent, the ECTS credit points [3].

In the first part of our study, we considered the case that both courses A and B are offered by CUBER partners, i.e. that metadata for both courses are available to serve as input to the acknowledgement algorithm. We started with a survey of the practice of course acknowledgement in the institutions, and partly, in the countries, that participate in the CUBER project. To do this, a questionnaire was distributed to all CUBER partners. The questionnaire contained questions about ECTS and on the current procedures for course exchange and acknowledgement. We evaluated the questionnaires received [4].

From the findings of this survey, we extracted the rules and parameters representing the process of course acknowledgement, i.e. the decision process whether one course can be exchanged against another. We identified the information about courses needed to evaluate those rules and parameters, and verified that this information is present in the course metadata.

We found that the decision process involves

- the courses´extent, e.g. the number of ECTS credits assigned to them;
- the courses´ placement in the curriculum, i.e. whether they are undergraduate or graduate;
- the courses´ examination methods, i.e. whether only presence of students was checked, whether assignments were evaluated, or whether there was an examination at the end of the course;
- the courses´contents, i.e. whether the topics covered by the courses match sufficiently.

Note that these findings are consistent with the findings of a study to evolve ECTS into the European Credit System ECS [5]. While the first three parameters can be compared more or less schematically, the comparison of the contents proved difficult. To overcome this difficulty, we apply a combination of standard categories and a self-adapting keyword database to represent contents.

Future Work

In the second part of our study, we are about to evaluate the acknowledgement algorithm found in the first part. This is accomplished by a field study that constructs a set of requests for course exchange and validates the rules found so far by a comparison of the decisions taken by the administration of two providers and the system, respectively.

Furthermore, we want to treat the case that course B is from a previous study of the prospective student, i.e. that no metadata are present for that course. In this case, the student must enter the relevant data about course B into the CUBER system. We will investigate how the necessary data can be input by the prospective student with minimal effort to increase acceptance and minimize user frustration, but also providing enough information from the CUBER system´s point of view. As course content descriptions will surely be among the data to be entered, we will in particular investigate how this can be done such that the user is supported by the system and thus helped to use the standardized descriptions the CUBER system needs. It is however clear to us that there will be no perfect solution to this challenge, as this could easily mean a project of ist own.

Last, we plan to investigate the issues regarding the reliability of data supplied by an arbitrary user, i.e. the constraints and plausibility checks to be applied to ensure that this data has some credibility at least.

Conclusions

Within the services provided by the CUBER system, flexibility for the user, i.e. the prospective student, is a strategic goal to achieve acceptance. The facilities for course exchange, i.e. by automatic recommendation of possible alternatives to a particular course in a study programme, try to support this goal. The achievements towards automatic exchange or acknowledgement of courses are promising, as the ongoing evaluation indicates today.

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MEASURING UP: BENCHMARKING IN OPEN AND DISTANCE LEARNING

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Abstract

Among the improvement strategies and techniques, benchmarking has emerged as a useful, easily understood, and effective process for improving organisational as well as instructional models in the business world. It is an activity that looks outward to find best practice and high performance and then measures actual business operations against those goals. Benchmarking in education follows the same principle. We can discuss:

- How is benchmarking being used in education?
- How can an ODL (Open and Distance Learning) Institution get started?
- What are the steps for Benchmarking?

Key Words: Total Quality Management, Benchmarking, ODL

Introduction

The new demands prompt staff in student support and professional development to explore new ways of working together to maximise their various skills and experiences. TQM and Business Excellence Concepts help to cope with future challenges in the educational sector. The vision of Business Excellence must generally not be pursued in separate projects limited in scope and time. Instead, it has to become an integral part of corporate planing and culture - thus embedding the continuous strive for the better in the organisation's value system (Mendonça, 2001).

Creating a *quality culture* within an organisation is increasingly recognised as one of the primary conditions for the successful implementation of Total Quality Management (TQM). To close the gap between the old and the required new culture one must also explore the quality improvement process for achieving business excellence through customer satisfaction. The new elements that will stimulate quality culture and create *business excellence* are the basic principles of TQM. They include:

- delight the customer,
- continuous improvement,
- management by fact,
- people-based management,
- leadership

TQM or the vision of *Business Excellence* relies on the idea that, in the long run, an organisation will only perform excellently when it succeeds in balancing the needs of all stakeholders. Long-term success requires customer satisfaction and loyalty, which in turn is based on employee satisfaction. The focus shifts from mere product or service to corporate quality-summarised in the vision of Business Excellence.

One of the defining goals of educational practice is now *flexible learning practices*, where information is supplied to the student, now redefined as the 'client', via an array of mediums. Although educational practice has now branched into many mediums including, written and spoken word, which appear not only via print but which is also recorded, televised and electronically transmitted.

Concerning the Higher Education, the competition has been given effect by performance-based funding models and the publication of the performance of universities and courses in relation to particular *quality indicators*. This market driven approach has challenged the role of universities in society and increased demands for accountability, transparency, toward the principles of quality management.

Benchmarking in Education

Benchmarking is a highly respected practice in the business world. It is an activity that looks outward to find best practice and high performance and then measures actual business operations against those goals. Benchmarking in education follows the same principle. It is appropriate at a time when education reforms are focused on raising student and school performance.
Benchmarking can be defined as "on ongoing, systematic approach for measuring and comparing the work processes of one organisation to those of another. This approach is valuable for providing objective, fact based information to be used in the prioritisation and decision-making processes of the institution. When an institution uses the benchmarking process and data on an ongoing basis, it helps the managers see the broader picture by allowing them to examine these measures longitudinally over a number of years.

A review of the benchmarking literature shows that there are primarily four kinds of benchmarking: internal, competitive, functional/industry, and generic or best-in-class. Internal benchmarking can be conducted at large, decentralised institutions where there are several departments or units that conduct similar markets. The more common competitive benchmarking analyses processes with peer institutions that are competing in similar markets. Functional or industry benchmarking is similar to competitive benchmarking, except that the group of competitors is larger and more broadly defined. Generic or best-in-class uses the broadest application of data collection from different industries to find the best operations practices available. The selection of the benchmarking type depends on the processes being analysed, the availability of data, and the available expertise at the institution. Benchmarking is more then just gathering data. It involves adapting a new approach of continually questioning how processes are performed, seeking out best practices, and implementing new models of operation.

Benchmarking can be a tool for improving Quality. After processes are selected for analysis, the appropriate personnel, who have a working knowledge of the area undergoing the benchmarking analysis should then be chosen to conduct the study. Once the benchmarking data is collected and analysed, it can be distributed in a benchmarking report internally within the institution and externally to benchmarking partners for implementation of improved processes. The overall goal is the adaptation of the process enablers at the home institution to achieve effective quality improvement.

Criteria for Benchmarking Standards

The objective, measurable criteria uses in benchmarking academic standards can fall into the following categories (Achieve's Benchmarking Initiative, 2002):
Clarity and accessibility: Standards should be written in clear prose, in a logical, understandable format. In addition, they must be specific enough about content to provide guidance to teachers as they develop lessons, to parents as they guide students' learning, and to curriculum and test developers who write standards-based materials and tests.
Measurability: To be useful, the standards must focus attention on the results of student learning, rather than the process of learning. Simply put, they must provide ample guidance to teachers as to how to recognize when students have mastered content knowledge and skills.
Comprehensiveness and focus: Strong standards should strike a delicate balance between including the breadth of essential content at each grade level, while also allowing for in-depth treatment of the most important content knowledge. It is essential that standards define a manageable core and make tough choices about what is most important for all students to learn, and then explore those topics thoroughly.
Balance: It is important that standards achieve a balance between what students should know (i.e., content knowledge) and what they should be able to do with that knowledge (i.e., skills). Content knowledge in and of itself is vitally important, but so too is being able to use that knowledge to solve problems.
Rigor: To be considered rigorous, standards should introduce challenging content and expect mastery at the appropriate grade levels. This content should progress from year to year, with some new content being introduced and some disappearing at each level as students master the content and move on to more challenging material. In order to gauge rigor, Achieve suggests comparing standards with the best examples from other regions and nations (what is called "benchmark standards").

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ENABLING PROFESSIONAL COMMUNICATION FOR PRACTITIONERS ACROSS EUROPE

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Abstract

This paper describes the evaluation of an online training course in Neonatal Medicine, which involved medical practitioners from across Europe. The paper focuses on the findings from an analysis of the online discussion groups. The project aimed to develop an online course for practitioners and included the development of four modules. Delivery was achieved using hybrid technology via distribution of course materials on CD ROMs accompanied by an online learning environment and associated Web discussion boards. Twenty participants completed the programme over four months, supported by five tutors and one project manager. The main conclusion from the external evaluation was that the project had met its stated aims and objectives and that the project team had delivered a successful online course. Both tutors and tutees engaged enthusiastically with the course throughout. It was evident that participants enjoyed the course and found it valuable, with the most important element of the course consistently being cited as the opportunity the course afforded for the sharing of expertise and best practice with colleagues across Europe.

Introduction

The growth in the use of the Internet in the past five years has been paralleled by a growth in the number of online distance learning courses. The perceived benefits of this form of learning include the opportunity to learn anytime, anywhere and to communicate and collaborate virtually across countries. For teachers online courses have been seen as beneficial as a way of reaching new student markets, offering more flexible learning opportunities for students, facilitating the tracking of student progress and activities, as well as providing an opportunity for creating new and innovative learning environments.

A variety of Virtual Learning Environments (VLEs) and associated tools have developed to support the developed of online courses and distance learning. There is now a wide range of VLE systems, both bespoke and off the shelf. The Joint Information Systems Committee (JISC) recently carried out a review of current activities in the development of VLEs and has commissioned a number of projects to develop Managed Learning Environments (MLEs), where the VLE is integrated into University systems such as student records, personnel data, finance and other administrative back end systems [1]. A review of VLEs and their use in UK medical schools has recently been undertaken [2]. It presents data collected from 21 medical schools around the UK, including 6 in-depth case studies.

A considerable body of research has been carried out on the effectiveness [3] of online courses. However many research questions still remain unanswered. How effectively do these kinds of systems support learning? Are they more effective than face-to-face learning? Which aspects of learning are best suited to online learning and which to face-to-face? How much time does the development and implementation of online courses take? What skills do teachers and students need in order to use online learning environments effectively? A sample of some of the different research strands and activities can be found in [4]. In addition, Lockwood and Gooley have recently co-edited a collection of essays on successful developments in online and web-based learning [5].

The online course in Neonatal Training in Europe

The project being evaluated was funded under the Leonardo da Vinci European programme and consists of a lead site (Southampton University NHS Trust) working in conjunction with three partner sites across Europe (Denmark, Germany and Greece). The project aimed to develop an online course

in Neonatal training, consisting of four learning modules. The course was to be delivered online to doctors across Europe, supported by a core of tutors from the project team.

The course was divided into four modules: Neonatal Sepsis, The Central Nervous System, Outcome Evaluation for Neonatal Conditions, and Neonatal Respiratory Module. Each module was designed in the same way, beginning with the module objectives, followed by four sequential sections: revision materials, curriculum topics, resources, and a section entitled 'the future'. The intention was that modules would be designed from good, solid pedagogical principles, with an associated set of clear learning objectives and outcomes. The four modules ran consecutively, each module running for approximately one month. Each module required four learning hours a week, 16 in total. Overall the whole programme therefore represented 64 learning hours. The number of hours for each module related to the standard curriculum that ordinary medics complete.

The online resource was divided into two 'zones', a CD-ROM zone and a Website zone. All materials for the course were made available on CD-ROMs, which were distributed to participants by post at the start of each module. All materials were also mirrored on the Website. The hope was that this would reduce the amount of time students needed to be online and hence reduce costs. It was also hoped that this approach provided a more structured user-friendly learning environment for the participants.

The project used both asynchronous and synchronous communication. Asynchronous communication was divided into three main areas, i) group discussion conferencing rooms (for discussion of particular topics related to aspects of the learning materials), ii) a coffee room (open to everyone, for general communication and socialising) and iii) a staff room (closed for tutors to discuss administration and teaching issues). Participants also had access to a synchronous chat and paging facility.

Evaluation methodology

A multi-faceted evaluation was carried out, following the philosophy of utilization-focused evaluation outlined by [6]. This consisted of the following components: i) an evaluation questionnaire distributed to all participants, ii) an analysis of data gathered via two online reflection fora, and iii) an analysis of the Website and associated CD ROM material. Full details of the evaluation have been reported elsewhere [7], this paper will concentrate on the analysis of the online discussion fora.

Two online reflection fora were set up, one for discussion with the supervisors and one with the trainees. In addition, the course was monitored throughout the duration of the programme and a detailed evaluation of the course materials and the CD ROM content was carried out. The discussion boards associated with each of the four modules were analysed, along with data gathered about individual participants' usage, logins and postings.

Data analysis

Ten participants contributed to the online reflection fora, a total of 12 postings were received under the trainees' online forum and two under the supervisors' forum. A number of key themes emerged, some of which echoed the findings from the evaluation questionnaire. Feedback on the Website was mixed; on the one hand they felt that it was good, but a navigational issue arose in terms of being able to find things once they were up for a while.

The pattern of usage of the Website was carried out. A total of 19 participants were initially enrolled on the programme, supported by 5 tutors and 1 project manager. Seven participants with very low logins (less than 20 logins) are deemed to have dropped out of the programme and their participation was excluded from the evaluation. A new cohort of 6 participants joined the programme half-way through and completed Modules 3 and 4 and were therefore included in the final evaluation and analysis. As might be expected usage of the Web site by the 5 tutors and the project manager was very high throughout the programme. Usage varied between participants but typical logins for active participants were in access of 100 logins during the programme. From the data gathered from the questionnaire, patterns of when participants accessed the site varied, showing that they did study at a range of times across the cohort. In general each participant tended to have their own preferred study

time, some choosing to work afternoons, others in the evenings, some only during the week, whilst others also accessed the course at weekends. This flexibility of working patterns was evident in the responses from participants as well. For example one participant stated:

"…. I find doing this relatively easy as it fits round my work commitments and family" (KT)

This was reflected in her use of the Website, which was during the evening, Monday to Friday. Most participants logged into the site on a regular basis to keep up to date with new materials and messages being posted.

Not surprisingly, the highest number of logins was from the project manager, followed by the lead tutor with 478 logins. The remaining two tutors had a total of 202 and 105 logins respectively. Eleven of the participants have high login records and evidence of active participation ranging from 294 to 96. One of the most active of these was a member of the (late starting) Group 4, with a total of 193 logins. The remaining 8 participants have logins of between 60 and 25, although many in this range were from Group 4. There were a total of 8 female and 10 male participants, supported by 5 male tutors and a female project manager. In terms of the total number of logins, the female participants logged in a total of 1181 times (59.1% of the participant logins) and the male participants logged in 817 times (40.9%). Inclusion of the number of logins from the tutors and the project manager gives total female logins of 2257 (56.3% of all logins) and 1752 male logins (43.7% of all logins). In terms of the total number of postings, the female participants posted a total of 254 messages (66.7% of the participant postings) and the male participants posted 127 messages (33.3%). Inclusion of the number of postings from the tutors and the project manager gives total female postings of 555 (47.1% of all logins) and 623 male postings (52.9% of all logins).

The number of postings maps reasonably well to the ranking order for the total number of logins, with participants who login in frequently also being more active in terms of their total number of postings. Once again the project manager and the tutors contributed the greatest number of postings. Analysis of the discussion boards indicated that the majority of these postings were concerned with administrative details about the course, along with some degree of help/support on technical details. The project manager posted 301 messages and the five tutors posted 194, 154, 87, 48, 13 respectively, the order of activity mirroring the ranking in terms of total logins. One participant was particularly active, posting double the number of messages (163) of any of the other participants. A cluster of three postings followed this between 86 and 88, again by participants who had high login values. The postings then tailed from 65 down to 14, again mainly echoing the login ranking, with one exception. The high login of 193 from the Group 4 participant did not link to a high number of postings, which at 26 was towards the lower end of activity.

Each module was supported by a set of learning materials and an online forum. As each module was completed the discussions were archived and the space cleared for the start of the new module. There were a total of 24 fora. Two online reflection fora ('Reflections for trainees' and 'Reflections for supervisors') have already been discussed. Three fora ('Module 1 archive', 'Module 2 archive' and 'Module 3 archive') contain only one message each and are not discussed further. Likewise 'Module 4 assessment conference', 'House rules', 'Web zone' and 'Link back to educational site' are essentially specialised administrative or help and support fora dealing with particular topics and are not discussed further. The main fora fall into four categories: the group discussion fora (which consists of the plenary forum and the 11 group discussion fora), the course development discussions (within the 'supervisors forum'), a socialising forum ('coffee room') and a dissemination area ('notice board'). The following discussion will concentrate on these 15 fora. Discussion activities within these 15 fora fall into five main types: Administration, Task setting, Socialising, Help and support, and Feedback and discussion. These categories were developed from analysis of the emergent themes arising from the questionnaires and the online reflection fora, along with analysis of the content within the discussion boards. Further results and findings will be discussed in more detail at the conference presentation.

Conclusion

There were a number of important findings and recommendations from the evaluation. A selection of key findings is highlighted here and will be elaborated upon in the conference presentation.

Overall the participants enjoyed the course, found it useful and unanimously said that they would use this form of learning again, however a key issue for all participants was a lack of time to dedicate to the programme. A consistent theme, which emerges from the evaluation, is the sense of the development of an online community and participants appeared to enjoy the course particularly because it gave them the opportunity to network and discuss views with colleagues. Participants felt that the schedule of the overall programme was too tight and that not enough time was available for discussing each of the modules. In addition, it would have been helpful if there had been a greater break in between modules. The value and importance of the online discussions came out consistently as one of the best aspects of the course. Furthermore the role of tutors in leading group discussions and guiding modules was critical to the success of the course. Participants stated a preference for those modules where the supervision was good and it was evident that there was a direct link between this, participant satisfaction and enjoyment of the course.

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CRITERIA OF EVALUATION OF AUDIOVISUALS IN MULTIMEDIA PRODUCTIONS (CRIMP)

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Introduction

Developing and producing state of the art multimedia teach ware means to incorporate remarkable portions of audiovisual elements. In their every day life learner are accustomed to consumption of films and videos of high technical quality e.g. TV programs, DVD productions or IMAX cinema, including especially 3D-techniques, music and sound effects and a lot of formal and dramaturgical means to reach a higher level of attention and motivation to consume this special media product. The costs for using these techniques and such productions are extremely high. Relating to multimedia productions for teaching and learning one has to answer the question, what kind of technical and (post)production requirements are necessary to attempt highest results in motivation, perception, memorizing and understanding.

On a theoretical level, the enhanced dual-processing model for multimedia-learning (Mayer and Sims 1994) provides a useful learning-theory that allows the generation of hypothesis about the processing of learning in a multimedia context.

Normally, multimedia productions incorporate different modalities (e.g. auditory and visual). Due to the fact that a multimodal presentation enhances learning abilities (e.g. Dubois and Vial 2000, Mayer and Moreno 1998, Mousavi, Low et al. 1995, Stiller 2001, but see Goolkasian 2000), multimedia based trainings have a good educational potential.

As pointed out by Dubois and Vial (2000) there are still only a few studies devoted to the effects of the simultaneous use of different media coming from a single source. Therefore, intermedia interactions have not yet been the topic of systematic experimental research in the field of multimedia learning.

When presenting visual content concurrent narrative spoken text results in better learning capabilities than written text (e.g. Mayer and Moreno 1998, Mousavi, Low et al. 1995). The impact of additionally auditory signals such as music and sounds has been a topic in research. According to arousal theory, adding entertaining auditory adjuncts results in a greater level of attention which results in an improved performance in retention and transfer (Renninger, Hidi et al. 1992). On the other hand, Moreno and Mayer (2000) show, that people receiving additionally auditory input performed worse than people without auditory adjuncts.

One of the unanswered questions in actual evaluation research is how do learners react to audiovisuals of different technical quality? Which parameters can be reduced without influencing the motivation of the learner or their learning efficiency? Or – on the other side: Which and how many effects (2D/3D, sound), what kind of textuality / segmentation and dramaturgy is needed for the purpose of optimized learning results?

The general goal of the just started CRIMP-project is to assess the effects of audiovisuals in multimedia learning systems, because developing state of the art multimedia teachware means to incorporate remarkable portions of audiovisual elements.

One computer based training (CBT) of a multimedia production line for the topic cell biology (CD-ROM series “The Cell II: The Powerhouse”) is used as basic material. This application includes different digital media as video (RealVideo and QuickTime), 3D-objects (QTVR), computer animations and interactive teaching modules (Macromedia Director, Shockwave) and is primary made for educational purposes in high schools, colleges and universities.

Two modules of the CBT have been reduced stepwise or modified; thus, other versions of learning modules in different combinations of reduced and optimized parameters has been produced. The gain of knowledge of pupils while using these applications will be statistically analyzed.

Questions under investigation

CRIMP focuses on the following questions which will be statistically evaluated in an experiment involving pupil from schools in Germany and Sweden.

The role of navigation through the CBT:

1. What kind of navigation will be used?
2. Does user behaviour depend on prior IT-experience?
3. Does the "lost in hyperspace" (Conklin 1987, Tergan 1997) phenomenon occur?
4. Will users learn target oriented or will they be distracted by other content stored in the CBT?

Design of audiovisuals:

1. How real should audiovisuals be?
2. Do additional 3D-animations foster motivation and therefore learning output?
3. How instructive is the use of visual cueing elements?

Experimental design

Pupils of biology courses (classes 12-13) will be used for evaluation. Each pupil has to do a pre-test. It will evaluate three topics which are important co-variates. Prior IT-/PC-knowledge may lead to different user behaviour. Mayer and Sims (1994) stressed that spatial ability is an important factor for the construction of mental models. Nevertheless, although all pupil will be recruited from biology school-courses, their prior biological knowledge may vary due to individual abilities and different prevailing conditions, e.g. schools, teachers. Prior knowledge has an impact on learning efficiency and picture processing (see Stiller 2001).

Then, each pupil will be confronted for about one school lesson with one version of the CBT. Beforehand, a short (standardized) instruction about the CBT is given. This instruction allows each test person to use the CBT. Additionally a short (standardized) instruction about the relevant biological knowledge is given, which provides each pupil with crucial biological knowledge for understanding the biological content of the CBT. Each pupil has to fill out a post-test directly afterwards and after a two week period. The post tests will evaluate the gained knowledge while using the CBT.

The questions addressing the role of navigation will be evaluated by a log-file protocol. In the CBT, a procedure has been attached to each link. It saves the name of the link and the local time, if the link has been chosen. Thus, we are provided with detailed information about the navigation through the CBT and the time spent on its different content.

The questions addressing the design of audiovisuals will be evaluated by two modules of the CBT. The modul "ATP-Synthase" has been chosen in order to evaluate the impact of 2D / 3D – Animations and additional cueing elements for learning outcome. In total, four different audiovisual versions of the animation have been created. One version consists of a 3D-Animation without visual cueing elements while another 3D-Animation has additionally cueing elements. Two other versions have 2D impressions, which can be separated by the absence / presence of visual cueing elements. Thus, the four different versions create a two factorial design.

The other modul handles the topic "construction of the plant / animal cell". As in the "ATP-Synthase", four different versions have been created. In a stepwise reduction, they range from a 3D-Screen with visual cueing elements and additionally interactive 3D-Elements to a simple 2D-Screen. Possible differences in learning outcome can be correlated to reduction in multimedia design.

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DESIGNING A FLEXIBLE EVALUATION SYSTEM FOR ODL ENVIRONMENT — MODEL AND PRACTICE

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Introduction

This paper is based upon two projects implemented recently by the Budapest University of Technology and Economics (BUTE) Distance Education Centre. The first one was a research project aiming at the development of an evaluation framework and methodology of open learning systems. The second one was directed at the comprehensive development of the e-learning for the Faculty of Law of the Pazmany Peter Catholic University Budapest. In this latter project we had the opportunity to test and implement the Evaluation System's parameters like: effectiveness, flexibility, usefulness.

This paper is summarising the outcomes of the research, and achievements of the development implementation.

"Premia" project: The model

This project (1999-2000), initiated and financed by the Hungarian Open Vocational Training Foundation which ensured from public resources the determining proportion of funding for ODL development in 1998-2000, was implemented by a wide consortium of actors from the Hungarian education and training sector, co-ordinated by the BUTE DE Centre. The aim of the project was to work a model and working mechanism on:

- evaluation and analysis of open learning programmes
- using elements of quality management in ODL

The approach of the project to produce the output was to work with invited panel of experts from the project partner institutions, and form an Operative Evaluation Committee (OEC) to co-ordinate the research work, then the draft output was circulated in the ircle of relevant professional and social partners, after all the system was revised, and finalised.

"Szamtav" Project: The practice

This project was financed by the National Communications Authority and implemented by a consortium leaded by the BUTE DE Centre with project partners, the beneficiary Pazmany Peter Catholic University (PPKE) School of Law, and the IT provider Compax Ltd. The project started in the year 2000 and finished in 2001.

The aim of the project was to improve, design, and implement the technical and methodological background of the e-learning system of the PPKE

The objectives were:

- To provide edescription, external evaluation on the existing system and to work out detailed development proposal
- To evaluate the IT background and services applied and to work out detailed further development proposal on them

The implementation of the project included the evaluation of the PPKE e-learning practice, the survey of recent related international development of e-learning, searching for good practice in the relevant area, then to elaborate recommendations on the development of the University. The draft of the evaluation and the recommendations were discussed with the beneficiary University, then the recommendations were modified, and the finalised.

The evaluation policy

The research group reached an agreement, that the evaluation process must be

- in conformity the following criteria:
  - objectivity
  - paralel evaluation
  - validity
  - reliability
- complete and flexible
- efficient in the delegation of evaluation work (expert, evaluator, administrator/clerk)
- applicable for the planned and the already implemented programmes as well
- public
- quantitative
- cost effective
- quality managed for the factors of
  - objectivity
  - training of the evaluating staff
  - parallel evaluation
  - public control
  - handling complaints

The evaluation system

In the system of aspects there is a set of attributes which are defined, and before using the system some of them can be modified. The attributes are the following:

The name and number of aspect

Example: Definition of the target population.

The method of measurement

In this attribute we have three sub-attributes:

- Who is doing the measurement? Example: clerk.
- When do the measurement may take place? Example: before the delivery of the course.
- How the measurement is done? Example: upon learner questionnaire. In some cases this attribute is further explained in the Guide for evaluation.

Measure

This attribute is designed for quantifying the findings. Most of the aspects have three values:

- 0: No information in the documentation, or no conformity with the aspect.
- 1: The aspect is fulfilled in a defined quantity e.g. 30% of criteria is reached.
- 2. The aspect is fulfilled totally.

Weight

This attribute gives a high flexibility in the system. The weight is a multiplying factor that modifies the points' importance in the whole system. The weighting process is discussed later, but must be systematic, and serving a certain philosophy of the evaluator body.

Basic (sinequa non)

This attribute is a flag: Yes-no. If an aspect is basic, then the conformity is obligatory. No conformity leads to cancel the process. Example: Regulation of the learning process. If there is no learner contract, or other type of regulation on the process before the learner starts, the evaluation is cancelled with no

success. In those cases either the provider presents additional information, or the whole system will not be quantified.

Characteristics of the evaluation system

The main groups of aspects of evaluation

The following table is summerising the main groups of aspects, and the number of aspects in the different groups. The aspects in many cases contained sub-aspects.

	group of aspects	number of aspects
0.	Documentation (available)	-
1.	Aims and Objectives	4
2.	Professional content	4
3.	Structure of the programme	14
4.	Materials	13
5.	Learning support system	39
6.	Quality management	10
	summa	84

Basic (sinequa non) aspects

The following table is summarising the number of aspects in the groups which are necessary for completion:

	Group of aspects	Number of aspects
0.	Documentation (available)	1
1.	Aims and Objectives	2
2.	Professional content	1
3.	Structure of the programme	-
4.	Materials	-
5.	Learning support system	7
6.	Quality management	3
	summa	14

Expert evaluated aspects

The following table is summarising the number of aspects in the groups which are evaluated by experts: During the research project, the group of researchers aimed to keep the number of this kind of aspects law, due to the evaluation policy to be (cost) effective and flexible. The more expert time is needed, the more the system is depending on expert availability. The demand of objectiveness requires that all expert aspects must be assessed by two independent evaluators.

	Group of aspects	Number of aspects
0.	Documentation (available)	-
1.	Aims and Objectives	-
2.	Professional content	4
3.	Structure of the programme	5
4.	Materials	4
5.	Learning support system	-
6.	Quality management	-
	summa	13

Proposed weighting system

During the research project the group defined two systems: The first was called “natural”, where the multiplying factor is 1. This system is representing the focus of the research group, by listing a number of aspects in a certain group.

The other system is called “proposed”. This system is already holding the agreement of the expert group on importance of every one group of aspects. This proposed system is holding a consensus of experts of a given time, and circumstances. (On this field further research is promising.)

Therefore the evaluation guide emphasize: Before every specific use of the system, the weighting policy must be revised and modified if needed.

	Group of aspects	Natural %	Proposed %
0.	Documentation (available)	-	-
1.	Aims and Objectives	5,00	4
2.	Professional content	2,86	4
3.	Structure of the programme	15,71	20
4.	Materials	16,43	24
5.	Learning support system	46,43	28
6.	Quality management	12,14	20

Method of scoring

- The proposed action plan of the evaluation is the following:
- Searching for the basic aspects in the documentation
- Quantification or scoring (evaluator, expert)
- Weighting
- Classification: 0-30% not sufficient
  31-80% sufficient
  80-100% excellent

The implementation

During the Szamtav project the above described system of evaluation was implemented and used. During the implementation process the system was adapted and piloted.

The adapted evaluation policy

During the adaptation the structure of evaluation was not modified, this approach gave integrity to the process. During the implemented evaluation the implementation group emphasized more the objectivity, and the cost effectiveness.

Therefore the number of aspects evaluated by experts was lowered to 7 from 13. This fact can be derived from the role of evaluation in this project: In the project there was a dual evaluation system, an internal one made by the Pazmany University, the other was called external evaluation.

The set of aspects were modified for the special purpose.

Further simplification was made when unifying the role of clerk and evaluator. The original system had the feature of cost effectively evaluating large number of programmes, for example upon a call for tender in a foundation.

The accessibility of the detailes of the pilot were limited due to the fact that the whole project was a technical support to a private University.

The adapted system of evaluation

During the implementation all aspects were revised, and some of them were omitted. Those aspects were specific to vocational education, or were about professional content.

The most important omitted aspects are:

- professional content of the material
- aspects of the employer
- aspects on the type or manner of education as they are already defined in the curriculum.
- Some of the structural aspects as they are already defined in the curriculum.

At the end of the revision process, 72 aspect remained from the original 84.

The method of implementation

1. Revision and modification of the evaluation system with weighting
2. Designing and sending out questionnaires for some special aspects (after delivery type of aspects)
3. Designing an Excel table representing the system (limits of points, weights, summas)
4. Revision and collection of necessary documentation
5. Assigning job to evaluation staff with time pacing indication (deadlines)
6. Accomplishing the scoring process
7. Preparing the first draft and circulate it
8. Finalising the evaluation

Outcomes of the process

The evaluation system was fulfilling the aims of the evaluation policy. The process appeared to be straightforward, flexible enough, rapid, and cost effective. Among the aspects designed, only a few were fuzzy, modification was easy. The final scoring was acceptable to the beneficiary University, and the findings were meaningful for them. The system was flexible enough to be a part of a bigger evaluation system, and has the feature of "importing" data of different evaluation systems. This feature was originally not in the policy. The piloted system additionally helped the whole project to give recommendations to the University in a manageable, quantifiable way.

Summary and conclusion

During the period of 1999-2001 BUTE DE Centre elaborated a new and flexible way of evaluating Open Learning Systems. The group of experts from different fields of education could design and develop a working framework of evaluating materials, programmes and institutions, from a specific aspect, e.g. ODL service. This system was piloted and has proven to be a properly functioning system.

In the future there is a big challenge to continue the research to work out a databank of different aspects, and to offer more weighting systems representing different educational policies.

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INDIVIDUAL LEARNING STYLES AND E-LEARNING

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This paper highlights a selection of findings from seven years ethnographic research (1994 to 2001) into the underlying principals of e-learning and the effect individual learning styles has upon the design and integration of multimedia learning materials and delivery methodologies.

Introduction

Before the birth of Christ great Greek philosophers such as Socrates, Plato and Aristotle tried to identify the "stuff" of learning. By questioning, talking, thinking and meticulous observation they were able to identify some of the characteristics of learning and use these "methods" with their students in order to produce, compared with today's standards, some of the finest minds the world has ever seen. Even today people are in awe of the way in which scientific, cultural and political investigations were undertaken, using the most basic of instrumentation, and the accuracy of the results obtained. The Greeks however thought that 'the mind was a splendid tool - one of the most delicate, and potentially one of the most precise instruments that one could imagine' (Downey, 1964). Although we have entered an age of new technology this statement is still as relevant today as it was then.

In more recent times the study of individual learning styles (Honey and Mumford, 1992; Lockitt, 1997) has attracted the attention of psychologists and educationalists in the hope of identifying the 'key' to individual learning, development and success. Although a great deal of research has been undertaken into the area of 'learning styles' (Honey and Mumford, 1992) there are still as many individual styles of learning as there are learners and the 'key' to learning remains as elusive as ever. When observing the learning process common factors are evident but the ingenuity of the human mind is such that once individual patterns of learning have been established (Kolb, 1984) they can quickly be manipulated and adapted to suit the learner's individual requirements. David Kolb (1984) developed the work of Dewey (1938), Lewin (1951) and Piaget (1971) and put forward a 'Learning by Doing Model' that identified four separate stages that the learner must complete in order for the learning process to be truly effective.

Research undertaken by Peter Honey and Alan Mumford (1986) found that although individual learners possessed a specific learning style the majority of learners had no idea what learning styles were, or how they came to acquire their own. Honey and Mumford (1992), by adapting the Kolb (1984) learning styles inventory, were able to identify four learning styles which they termed *Activist*: *Reflector*: *Theorist* and *Pragmatist*. With advances in technology ICT (Information Communication Technology) is now commonly used within modern learning environments. Schools, colleges, universities, business/industry, are all becoming dependent upon ICT. However, research data available indicates that when using technology as a delivery methodology the learning outcomes are only equal to, or just slightly better than, more traditional teaching methods (NCET, 1995; Lockitt 2000). The designers of ICT based learning materials and environments also need to have knowledge of individual learning styles if the materials they produce are to be effective. The processes of acquiring knowledge, skills and the ability to identify the essential components of learning for learners of different abilities and backgrounds is essential if comprehensive ICT systems, materials and environments are to be developed.

Overview of research questions and findings

Learning Styles

- what effect does the individual's learning style have upon the learning experience;
- what effect does the individual's learning style have upon the production and use of multimedia learning materials.

The research data indicated that every individual has a preferred method of learning and these influences the way in which they accumulate knowledge and skills, not only in educational environments, but also throughout their normal range of every-day activities. The implications of individual learning styles was discussed in some detail in chapter three of the Doctoral Thesis and generic models that used ICT as their main delivery methodology were put forward and tested by the Researcher during 1994 to 1996.

The Researcher observed a large number of learners and staff within a variety of learning environments during the period of the research. He also undertook a number of formal and informal evaluations and questioned learners, staff and senior managers about the implications of ICT in education and training. This long term ethnographic approach led the researcher to conclude that individual learning styles play a major role in the effective design and delivery of MFOL (multimedia, flexible and open learning) materials. Those people designing and delivering MFOL within further and adult education need to be aware of the implications of individual learning styles and how ICT can be integrated into the curriculum and the influence it has on the learning outcome. By informing and training both staff and learners to use their individual learning style they are able to make informed decisions regarding their individual learning programme.

The learning style questionnaire analysed in chapter four of the Thesis highlighted a number of issues regarding preferred learning methods and styles. The questionnaire identified that learners perceive enjoyment as the most motivating factor within the learning process. The responses to the questionnaire indicate that the majority of people found MFOL experiences that were relevant to their individual needs, easy to use, interactive and integrated into group work and discussion groups more enjoyable than the normal 'presentation' type materials they were used to. The responses to the questionnaire also indicated that the age of the learner affected their perception of 'enjoyment'. The younger learners preferring true 'multimedia' made comparisons with computer games and video. The older learners preferring ease of use and ability to find information quickly.

All learners identified 'hands-on' as the preferred method of learning although when questioned by the Researcher 'hands-on' had several different meanings. The overriding feature of the term hands-on given by the respondents focused on the involvement of the learner in the learning process and the perception that their input was being integrated into the learning process itself. This interactivity, involvement and relevance when using MFOL materials was reiterated a number of times during the questionnaire and subsequent questioning by the Researcher.

At the time of undertaking the research there was very little resistance to the use of MFOL materials, this was surprising as the quality of MFOL materials at that time was recognised by a number of leading further and adult education bodies as being poor. When questioned by the Researcher respondents noted the flexibility offered by MFOL materials and environments and this availability and flexibility held more weight than the poor quality of the materials. It may also be that the 'novelty' factor distorted the view of learners in as much as many had not seen MFOL materials previously and could therefore not make a comparison. The younger learners could however compare the materials with games software and were more inclined to criticise the quality of MFOL materials than the older learners. However, even younger learners used material they had criticised as long as it was relevant to their work, they could find information quickly and it added value to their learning experience.

Staff Development:

- is there a relationship between the expectations of the learners and the ICT skills of the staff involved in the delivery of multimedia learning.

Staff, learners, management and Government have all identified ICT staff development as an issue throughout the research. The data obtained during the research for the Thesis, together with that obtained from external sources, indicates that the ICT competence of staff does affect the educational outcome when MFOL materials and delivery methodologies are employed in the delivery of the curriculum. ICT competent staff are better able to support learners using new technology within MFOL environments and when questioned by the Researcher learners stated that they had more confidence in staff that were both curriculum and ICT competent, in particular at the early stages of a

new learning experience. The Researcher also observed that staff who were not competent in the use of ICT tended to use traditional delivery methodologies even when the learners were keen to use the technology and in some cases recommending its use to their tutor and peer group.

Effective delivery of MFOL materials also requires tutors who are able to impart to the learners an understanding of the learning process itself. Unlike traditional curriculum delivery MFOL necessitates that the learner must be able to 'self manage' the learning experience. Most of the time MFOL learners will be accessing learning at their own pace at their own time and in different locations. Learners must be aware of the basic fundamentals of learning in order to compensate for the lack of tutor support, they need at least to have enough skills to recognise when the learning process is not proceeding according to plan and be able to ask for help and assistance. Learners who do not have these skills will quickly drop out of the learning programme when they experience difficulties.

The ability to tutor on-line (virtual tutoring) is now being recognised as a particular skill in itself and a number of institutions (University for Industry, Open University) have encountered problems finding enough competent on-line tutors. Several courses are now being run, many via virtual institutions that develop the on-line skills of tutors and offer recognised qualifications. With the advent of the University for Industry large numbers of virtual tutors will be required to offer curriculum specific support during 2002.

ILT/ICT Resources

- what effect does technology have on the learning experience;
- will technology remove 'barriers' to learning;
- can the effectiveness of MFOL materials and resources be evaluated.

At the commencement of the research it was evident that technology would play an increasing role in the delivery of education and training within further and adult education. However, even the most committed supporter of ICT would not have envisaged the impact the Internet, WWW and local Intranets have had upon the way in which the curriculum is now delivered. Technology is set to revolutionise the learning experience and open up new learning pathways for millions of people who would otherwise not have bothered to undertake any educational advancement other that that of compulsory education.

However, it is the very speed at which technological advances are being made that have affected the delivery of education and training within further and adult education. Most colleges invest a large proportion of their budget on ICT and the questionnaires undertaken by the Researcher and those of BECTA (British Educational Communications and Technology agency) indicate that although the actual computing power, in the form of memory, speed and hard disc capacity, has increased the number of 'redundant' computers has also increased. Computers are considered to be redundant if they are unable to operate identified standard software, or latterly, unable to access the Internet and run MFOL materials.

When the research started in 1994 software manufacturers produced software that used very little memory and had very few MFOL facilities or learner interaction. As the price of memory fell and the sophistication of equipment increased the software produced included more MFOL facilities such as sound, animation, video and learner interaction. This obviously affected the type of computer that would run the software and much of the equipment needed to be upgraded with CD-ROM players, sound cards and graphic cards. Within institutions that have over five hundred computers the cost of upgrading and renewal of computers is considerable and many work on a three-year life cycle. This method of resourcing inevitably means that the level of redundant computers will increase if the costs within the institution remain constant and the sophistication of the software increases.

The introduction of the Internet as the predominant method of delivery in further and adult education has meant that the MFOL element of the learning experience has taken a slightly backward step. In 1996 it appeared that the CD would prove to be the method of delivering MFOL materials and colleges invested heavily in developing LAN/WAN (local area networks/wide area networks) facilities that could deliver CD based MFOL material to their learning centres and learning bases.

CDs were produced that included large amounts of sound, video, animation and interaction and this material was delivered successfully via LAN/WAN technology. During 1996 the Government provided funding to colleges in England and Wales to connect to JANET (Joint Academic Network) and develop innovative delivery methodologies. It soon became clear that the Internet would dominate the delivery of MFOL materials and colleges and material manufacturers shifted their focus from CDs to Internet provision.

Unfortunately, due to the high cost of large bandwidth connections and lack of quality MFOL materials that could be delivered over the Internet much of the MFOL element of Internet devised MFOL materials disappeared. It was (and still is) virtually impossible to deliver the quality of video materials over the Internet that learners expect from television or CD based material. Sound also takes time to download and is still not of the quality expected by the majority of learners. The games market adapted a hybrid solution by providing the video and audio material on CD and the interaction via the Internet. This obvious, short-term solution has not been adopted within further and adult education and has therefore restricted the level of MFOL facilities and interaction the learner expects in today's 'digital age'.

Many of the programmes initiated by the Government, such as the University for Industry and UK on-line are intended to drive down the cost and increase the power of connectivity to JANET (SuperJANET) and other Internet providers. The main aim being to develop a national grid for learning that will be flexible and open to everyone who want to undertake a learning programme. This philosophy, together with the introduction of satellite and digital technology capable of providing wide bandwidth directly into an individuals home or workplace will, eventually, provide quality learning materials that once again have all of the featured expected by today's learners. However, in the meantime, much of the materials on the market designed for delivery over the Internet lack the MFOL features of CD based materials.

The barriers to learning

Although the introduction of technology into further and adult education has the potential to remove many of the traditional barriers to learning it does bring with it new barriers that need to be considered if MFOL is to be used to attract new learners. Although the potential for 'any time – any where' learning exists very few institutions have developed virtual support, learner management systems or quality curriculum materials that can turn the concept into reality. A severe limitation to MFOL delivery methodologies is also the way in which learners are funded from the funding council, the more flexible the course the harder it is to attract FEFC (further education funding council) funding. During 1996 the Government also introduced a cap on college numbers, this in effect stopped all flexible and open learning delivery that was not full cost recovery.

The initial cost of the technology is also a barrier when trying to attract disadvantaged groups of learners. Although the cost of computers has decreased and the sophistication increased considerably the basic computer, monitor and printer can still cost around £1000. This is a significant barrier to anyone unable to attend 'drop-in' resource based learning centres/bases. If the learner, due to cost, has to attend a resource based learning centre to use the computers this brings into play other barriers such as childcare, travel, disability and increased time. Although projects have been undertaken during the research that include taking portable computers into the community they are costly and only viable when external funding is available. Although the outcomes from such projects were encouraging in the majority of cases the projects were terminated when the project funding ceased. The cost of the technology negates many of the advantages and may in fact add new barriers to the learning process for the majority of learners.

For that section of society that can afford the costs the flexibility offered by technology has opened up new learning opportunities, However, the true 'any time – any where' ideal of MFOL delivery methodologies has still to be achieved by the majority of learners. In order to reach that potential the cost of technology needs to be reduced considerably or a national network of local learning centres/bases established that offer child care, free courses and are open at times learners want to use them rather than when the institutions want to open them.

The Researcher has developed a Web site (http://www.unlimitedpower.co.uk) that contains over seventy case studies, background information collected during the research and a number of publications and articles/publications relevant to e-learning. Examples of materials delivered via ***learndirect*** can be viewed at http://www.learndirect.co.uk and the University for Industry site is located at http://www.ufi.com.

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WHAT STUDENTS THINK ABOUT LEARNING THROUGH MULTIMEDIA ICT

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Introduction

Literature shows that students develop well-established opinions toward what ICT can introduce into an instructional process (Francis, 1993; Gardner, Dukes & Discenza, 1993; Smith, Caputi & Rawstorne, 2000; Yaghi, 1997) and that beliefs about the educational implications of ICT are unlikely to change spontaneously or as a mere consequence of knowledge acquisition, practice, or experience (Antonietti, Rasi, Imperio & Sacco, 2000). Attitudes toward the computer (Perry & Perry, 1998; Wilson & Whitlock, 1998) as well as naive conceptions of the effects produced by using distance-learning and multimedia tools in teaching induce to perceive differences between traditional and technology-based training (Liu, Ayersman & Reed, 1995; Swee & Barry, 1998; Tait, 1998). However, little is known about the specific psychological features that students associate to the use of computer for instructional aims. The present research was aimed at investigating such an issue.

Methods

In order to study what students think about the use of multimedia, computer-supported, instructional tools, a questionnaire was devised. It consisted of 30 items concerning various psychological aspects of educational software. In each item a statement was reported. The respondent was asked to rate on a 5-point scale (1 = minimum; 5 = maximum) his/her agreement about what was expressed in each statement. The items of the questionnaire are listed in the subsequent table (in the table items are listed in an order which corresponds to the decreasing values of the means recorded, whereas in the questionnaire they were listed in a different, random order, corresponding to the number quoted in parentheses); the subject of the sentence was always «Multimedia computer-supported instructional tools…»).

Items were focused on the psychological correlates of using multimedia ICT in instruction and concerned these issues: motivational and emotional aspects of learning (e.g., attraction, involvement, boredom, tiredness), behaviour during the learning process (active participation, effort), mental abilities required (attention, language, logical reasoning), style of thinking preferred (intuition, visualisation, reflection), cognitive benefits and learning results (better understanding, memorisation, application, overall view), metacognition (planning).

In the questionnaire the list of statements to be endorsed was preceded by a brief introduction explaining the aim of the instrument and of what multimedia instructional tools are; the simultaneous presentation of texts, pictures, movies, and sounds in such tools was stressed.

The introduction reported also the instructions to fill out the questionnaire and the request to list examples of multimedia educational tools that the respondents knew.

A total of 50 undergraduates volunteered in the study. Participants ranged in age between 19 and 26 years (mean age = 22.6; sd = 2.19). They were not paid nor received course credits. Undergraduates were divided into two groups according to the kind of faculty they attended: 24 humanities students and 26 scientific students.

Students were asked to participate to an investigation about the use of computer in education. Participants were told that they should fill out some questionnaires; students were told that the questionnaires were anonymous and that there were no time limit to fill it out. Beside the questionnaire described above, a questionnaire investigating habits and abilities associated to the use of the computer and two questionnaires measuring cognitive style - the Coding Preference Questionnaire (QPC)

(Antonietti & Giorgetti, 1993) to measure the verbalizer-visualizer style and the Your Style Of Learning And Thinking (SOLAT) (Torrance, 1988) to measure the intuitive-systematic style - were administered to test possible relationships between opinions about multimedia ICT and, respectively, computer experience and style of thought (Shaw & Marlow, 2000). The questionnaires were administered to students in the university campus before the beginning of a class.

Results

The following table reports mean rates computed in each item considering the whole sample.

Item	Mean	Sd
Make the comprehension easier (19)	4.04	1.01
Are attractive (29)	4.00	1.12
Facilitate persons who have a visual thinking style (6)	3.90	1.16
Make notion memorisation easier (17)	3.64	1.14
Induce to make comparisons and links (25)	3.56	1.05
Make notion application easier (15)	3.56	1.01
Are useful to schematise concepts (8)	3.54	1.01
Are suitable for persons who are bored in a short time (7)	3.42	1.26
Allow to learn fast (16)	3.40	1.09
Allow to learn with no effort and/or in an implicit way (14)	3.36	1.12
Help persons to have a global overview (12)	3.34	1.08
Help people to re-elaborate notions and to reason about them (10)	3.30	1.02
Facilitate persons who have an intuitive thinking style (26)	3.28	1.13
Require concentration (23)	3.28	1.16
Make notions convincing (13)	3.26	1.34
Facilitate people who have much imagination (9)	3.24	1.13
Induce persons to be active (1)	3.22	1.07
Facilitate persons who tend to think schematically (30)	3.16	1.20
Facilitate persons lacking of linguistic abilities (11)	2.94	1.10
Are suitable for logic persons (24)	2.94	1.17
Require to keep in mind the overall picture (28)	2.74	1.08
Require to plan actions (18)	2.54	1.07
May be too involving (27)	2.46	1.39
Require to think simultaneously to various things (5)	2.45	1.18
Are tiring (3)	2.40	1.36
Are suitable for thoughtful persons (2)	2.28	1.13
May be confusing (22)	2.14	1.18
Are appreciated by people who like adventures (21)	2.12	1.30
Require creativity (20)	2.04	1.11
Are not suitable for precise persons (4)	1.86	0.97

The inspection of the table shows that means are distributed along a relatively wide range of values. It is worth noticing also that in each item the distribution of responses covered all the range of the possible rates (from 1 to 5). Thus, items of the questionnaire seemed to be adequately discriminative.

The overall picture that emerges is encouraging: in fact, negative items - that is, items reporting statements which describe possible limits and risks (too involving, tiring, confusing effects) had low mean values. Furthermore, the highest rates concerned properties which are not trivial: for example, students appreciated very much the opportunity that multimedia tools allow to make links and comparisons, to apply the notions assimilated, to schematise concepts.

Mean rates of each item were calculated separately for the male and the female subsamples since gender differences in computer attitudes are often reported (Colley, Gale & Harris, 1994; Schumacher & Morahan-Martin, 2001; Shashaani, 1993; Shashaani & Khalili, 2001). T- test revealed no significant differences.

No significant differences were found also by comparing humanities and scientific students, as well as by comparing students who reported a frequent vs infrequent use of computer, by comparing students who self-attributed high vs low computer use ability and by comparing students who knew vs students who did not known multimedia educational software. Finally, responses given to each item of the questionnaire about the representation of psychological dimensions associated to multimedia instructional tools were not correlated to cognitive styles as measured by QPC and SOLAT.

The study carried out about students' beliefs concerning the psychological impact of educational multimedia packages indicated that undergraduates identified a large number of opportunities stressed by theorists and researchers in the field of ICT applied to instruction. It is worth noticing that not only the most blatant qualities of ICT were recognised, but also more sophisticated, not self-evident issues were appreciated. The representation studied here appeared to be internally articulated: consistent clusters of items emerged, suggesting that opinions investigated are coherent and organised into specific dimensions. The representation at hand seems also to be stable. It is not affected by gender, by the use of the computer, by computer expertise and by previous experience with educational software. The overall picture that emerges from the investigation is that students have a well-defined and deep-rooted conception about what multimedia tools can introduce into a learning process. This stresses the need to pay attention to what students think about the ICT that they are asked to use. Such an attention is important in order to verify whether what is relevant in the teachers' opinion is also relevant in the learners' opinion and to test whether well-focused interventions are needed to lead students to reject inadequate conceptions about ICT and to realise educational properties of ICT whose they are not aware.

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INDIVIDUAL DIFFERENCES IN ATTITUDES TOWARDS AND CHOICES OF LEARNING/TEACHING TECHNOLOGY

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The Open University of Israel (OUI) is a distance learning university. Learning is based mainly on specially written textbooks and tutorial meetings in learning centers throughout the country. Indeed, meetings with tutors at learning centers bring the university closer to the students and allow for face to face interaction between tutors and learners and among the learners themselves. However, these meetings sometimes do not materialize, as it is difficult to find enough expert tutors for all groups of students, or students are so dispersed that though many are registered for a course, there are not enough students in each region to justify hiring a tutor.

Synchronous virtual tutorials, via satellite communication, from a studio at the university to classrooms throughout the country (by the best tutor) - have been conducted during the last five years as a solution to these problems. The communication between the tutor and the students is visual, audio and data-based. The visual communication is uni-directional from the studio to the classrooms (where the tutor is seen on a big TV screen). Audio information is bi-directional (from the studio to the classrooms and from the classrooms to other classrooms and to the studio). The lecturer and the other students can hear the student who has been given the floor by the tutor. With respect to data communication, the lecturer can present multiple choice questions to the students, ask them to answer the questions by pressing an appropriate button on the satellite phone, and immediately present the distribution of answers to the students.

Seven such two-hour satellite tutorials were conducted in a "Basic Research Methods" course during 5 semesters. A number of factors gave rise to second thoughts about the choice of synchronous satellite tutorials as an ultimate solution: (a) only 25% of the registered students joined the tutorial sessions; (b) most students who joined the tutorials did not participate actively in the interactions initiated by the tutor or did not initiate any interaction themselves; and (c) the satellite technology has proved to be very costly.

Each satellite-based synchronous tutorial is saved on a videocassette. Instead of a new satellite production each semester, the recorded videocassettes can be sent to students as asynchronous tutorials. Before implementing such a change, a research project was conducted to study students' preferences.

Students' choices between the two tutorial modes (the satellite-based synchronous tutorials and the satellite-based asynchronous videocassettes) are probably sensitive to the differences between those modes as described in **Table 1**.

Table 1: Factors differentiating between satellite-based synchronous tutorials and satellite-based asynchronous videocassettes

Dimension	Satellite-based synchronous tutorials	Satellite-based asynchronous videocassettes
The location of the tutorial	In classroom	At home
Time of tutorial	Specific – tutor and students at the same time	Flexible at students' convenience
Accessibility of materials	Not accessible after the end of the lesson	Accessible at any time
Interaction with the tutor during the tutorial	Possible	Impossible
Interaction with other students during the tutorial	Possible	Impossible
Cost of technology	High	Low

As can be seen from Table 1, the two types of tutorials differ in the amount of control the student has over the learning process (the first three dimensions) and in the amount of interaction between tutor and students (in the last two dimensions). Learner control is known to be associated with active learning and student-centered learning (Doherty, 1998). Interactions between students and tutor and among the students themselves is one way to increase instructional immediacy and social presence which are positively related to students' satisfaction and motivation in learning (e.g., Christophel, 1990; Swan, 2001**).** Are students' preferences for tutorial modes related to their need of control over their learning process and to their need for social immediacy? The present study was aimed to explore this question.

Method

Design and participants: In Step 1, a "learning habit preferences" questionnaire was constructed. The questionnaire was administered to 288 "Research Method" students who participated in face-to-face tutorials (Group 1). In Step 2, a validation of the questionnaire was done on a new group of 92 students (Group 2) who participated in seven satellite-based synchronous tutorials. These students responded to two questionnaires: a feedback questionnaire relating to different aspects of the synchronous tutorial mode and to the "learning habit preferences" questionnaire. In Step 3, another validation of the questionnaire was done on a new group of 73 students (Group 3) who experienced three satellite-based synchronous tutorials and four satellite-based asynchronous videocassettes. These students responded to three questionnaires: two feedback questionnaires (relating to different aspects of the synchronous and asynchronous tutorials they experienced) and to the "learning habit preferences" questionnaire.

Questionnaires: "Learning habit preferences" Questionnaire - The purpose of the questionnaire was to explore students' preferences concerning the dimensions mentioned in Table 1: (a) the importance of autonomy in management of learning time; (b) the importance of ease of accessibility to all learning materials; (c) the importance of synchronous interactions with the tutor and (d) the importance of synchronous interactions with other students. For each of those dimensions a number of statements were constructed differing in their direction (positive, negative) and their kind of influence (cognitive, emotional). For example, with regard to time management:

1. When I am responsible for my pace of learning, I feel I have control (positive, affective)
2. When I am responsible for my pace of learning I feel helpless (negative, affective)
3. My learning is more efficient when I am responsible for my pace of learning (positive, cognitive)
4. My learning is more efficient when the timetable of the course is determined by the teaching team (negative, cognitive).

The questionnaire included 56 statements (in random order). The response scale to each item was a Likert scale from 1- "doesn't describe me at all" to 5 - "describes me very well".

Feedback questionnaires: Two feedback questionnaires were constructed, one for each tutorial mode (satellite based synchronous mode and satellite based asynchronous videocassettes). One part of both questionnaires asked subjects about their attitudes towards the interaction components of the tutorials. In the last part of the questionnaires subjects made their choices regarding different tutorial modes (face to fact tutorials, satellite based synchronous tutorials, satellite based asynchronous videocassettes).

Results

A factor analysis was performed on the responses of 288 students in Group 1. Four factors were revealed: time management (high score indicates learning autonomy), ease of accessibility to learning material (high score indicates the subject's need to "have" all material), positive aspects of interaction (high score indicates that the subject has more positive views regarding interactions - with tutor and other students) and negative aspects of interaction (high score indicates that the subject has few views regarding the negative aspects of interaction).

Two interesting phenomena were identified:

1. There was no differentiation between the emotional and the cognitive dimensions.
2. The items relating to the interaction with tutor and students were not divided according to what seemed to be obvious factors (tutor vs. students), but according to the direction of the interaction (positive vs. negative). Contrary to intuitive perception which sees the two extreme sides of a dimension (high vs. low) as negatively correlated, the Psychology literature on attitudes demonstrates that often the two end points of a dimension are two independent factors (Eagly and Chaiken, 1998).

Four scores were constructed for each subject, one for each factor. The internal reliability (calculated by the Alpha Cronbach measure) of each scale was at least 0.9. Correlation coefficients were calculated between the factors: a relatively high correlation (0.51, $p<.01$) was found between the first two factors indicating that the more a subject is inclined to manage his own learning, the more he prefers to have all the material accessible. Though the two interaction factors are correlated (0.28, $p<.05$), the correlation is low, indicating (as already mentioned) that positive components of interaction (e.g. contribution to learning, social support) and negative ones (e.g. others' presence disturb) are perceived as two separate dimensions. There was no correlation between each one of the four scores and the following variables: gender, age and number of credits accumulated at the OUI. The average, standard deviation and distribution of each factor are presented in **Table 2**.

Table 2: Subjects' distribution (in percentages), average and standard deviation for each factor.

Distribution and measures	1. Time management	2. Accessibility to learning material	3. Positive aspects of interactions	4. Negative aspects of interaction*
Low (1-2.5)	13.4	9.4	6.5	1.1
Median (2.5-3.5)	38.6	27.8	47.3	19.7
High (3.5-5)	48.1	62.9	46.2	79.2
Average	3.43	3.70	3.45	3.98
Standard Deviation	0.77	0.79	0.59	0.57

* A high score indicates a belief that the interaction has **less** negative aspects

The following picture emerges from Table 2:

1. The average of each factor is slightly higher than the average score of the scales (3).
2. Half of the subjects prefer to manage their own learning time, while the other half are indifferent.
3. Most subjects prefer having all material at hand, while a third are indifferent.
4. 45% of subjects perceive the interaction as positive.
5. Most subjects (nearly 80%) don't see negative aspects in interactions.

The "learning habit preferences" questionnaire was distributed among the 165 students of Groups 2 and 3. For each subjects the four factor scores were calculated. For each factor the distribution, average and standard deviation was calculated (similar to what was done in Table 2). The results in Groups 2 and 3 were very similar to those in Group 1, thus contributing to the validity of the questionnaire.

The validity of the "learning habit preferences" questionnaire can also be tested by the correlations between the interaction factors and students' attitudes towards different interaction components as experienced by them in the two tutorial modes they were exposed to in Groups 3. The score on the Likert type scale of each question given to students in the feedback questionnaires was correlated with two scores they had on the positive and the negative aspects of interaction (derived from the "learning habit preferences" questionnaire). **Table 3** presents the correlations. The bold correlations with the Positive Interaction factor are expected to be positive. The bold correlations with the Negative Interaction factor are expected to be negative.

Table 3: Correlation between answers to interaction questions (derived from feedback questionnaires) and interaction factors (derived from the "learning habit preferences" questionnaire), for group 3.

Question	Positive interaction	Negative interaction
Questions regarding Satellite-based synchronous tutorials:		
1. Are other students in my classroom important for me from a social perspective?	0.43**	0.02
2. Are other students in my classroom important to me from a learning perspective?	0.27	-0.12
3. Do other students in the classroom disturb me during the lesson?	-0.14	-0.08
4. Do questions by other students and the tutor's answers contribute to my learning?	0.52***	0.12
5. Do questions by other students and the tutor's answers disturb my learning?	-0.38**	-0.51***
Questions regarding Satellite-based asynchronous videocassettes:		
1. Do I miss the presence of other students from a social perspective?	0.41*	0.03
2. Do I miss the presence of other students from a learning perspective?	0.31	-0.02
3. Are other students in the recorded lesson important to me from a learning perspective?	0.51*	-0.11
4. Do other students in the recorded lesson disturb me during the lesson?	-0.07	-0.54**
5. Do questions by other students and the tutor's answers contribute to my learning?	0.48*	0.03
6. Do questions by other students and the tutor's answers disturb my learning?	-0.26	-0.45*

*p< 0.05 ** p<0.01 ***p<0.001

The results in Table 3 strengthen the validity of the learning-habit preferences questionnaire. Students with a high score on the positive interaction factor (the subject holds more positive views regarding interactions - with tutor and students) believe more than others in the social contribution of other students and in their learning contribution. Students with a high score on the negative interaction factor (the subject holds **few** views regarding the negative aspects of interaction) perceive students' interactions in class as less disturbing.

Are students' preferences for tutorial modes related to their need of control over their learning process and to their need for social immediacy? Students in Groups 2 and 3 were divided according to their answer to a question asking them to indicate what do they prefer: satellite based synchronous tutorials or satellite based asynchronous videocassettes. The two groups were compared on their 4 learning-habit preferences scores. **Table 4** presents those comparisons.

Table 4: Differences in learning-habit preferences between students who chose satellite based synchronous tutorial and students who chose satellite based asynchronous videocassettes (averages and standard scores).

Factors	Prefer synchronous tutorials	Prefer asynchronous tutorials	Significance level
Scale 1 – Time management	3.1 (0.9)	3.6 (0.6)	t(60)=2.36*
Scale 2 – Ease of accessibility to learning material	3.7 (0.6)	4.1 (0.5)	t(59)=2.4*
Scale 3 – Positive aspects of interactions	3.5 (0.5)	3.0 (0.6)	t(59)=2.4*
Scale 4 – Negative aspects of interactions	4.0 (0.5)	3.8 (0.5)	---

The two groups of subjects differ in 3 of the 4 learning habit preferences scores. As expected, those who chose the satellite-based synchronous tutorials (which have an interaction component) were significantly higher on Scale 3 (believing in the positive aspects of interactions) than those who chose the satellite-based asynchronous videocassettes. Moreover, those who chose the satellite-based asynchronous videocassettes were significantly higher on scales 1 (learning autonomy) and scale 2 (the need to "have" all the material) than those who chose the satellite-based synchronous tutorials. No doubt, these results contribute much to the validity of the "learning habit preferences" questionnaire.

Summary and Conclusions

A "learning habit preferences" questionnaire was constructed. The validity of the questionnaire was tested by: (a) a replication of its scores' distributions in two additional samples; (b) by its correlations with attitudes towards different tutorial experiences; and (c) by group differences between subjects who differ in their choice of tutorial mode (synchronous vs. asynchronous).

Subjects who preferred the synchronous tutorial were significantly higher in their belief in the positive aspects of interactions (Scale 3) and significantly lower on learning autonomy (Scale 1) and the need to "have" all material (Scale 2) than those who preferred the asynchronous mode.

In general, students' tutorial-mode preferences are determined by their learning-habits preferences as measured on a Likert type questionnaire. Their preferences are strongly determined by their attitudes toward the control of learning and the possible contribution of interactions.

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HOW TO BUILD UP A EUROPEAN ODL NETWORK?

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Introduction

The Europe of Knowledge has been reached creating equality of chance by the continuous renewal of knowledge and the availability of education due to the policy of the European Union, and the efforts of the national economies and the individuals. The significant scene of the development of the intellectual resources and lifelong learning is the ODL which uses flexible institutional frames, modern educational methods and infrastructure.

Several different distance education network models are present and functioning nowadays in Europe. The organisational structure, management, efficiency and financing of these differ greatly.

The EU SOCRATES/MINERVA programme „How to Build Up European ODL Networks" ended in 2001investigated different aspects of European distance education networking. The main objective of the one-year programme has been to prepare a study based on the comparative analysis of the different network models operating in Europe with the method of open and distance learning which contributes to the wider dissemination of open and distance learning, to the improvement of the quality of the up-to-date educational forms in the existing network by summarizing the experiences.

1. Research methods

The collaborating partner institutions (Dennis Gábor College – Hungary; Jutland Open University – Denmark; EDEN – Great Britain; Kaunas Technical University – Lithuania and Universitat Oberta de Catalunya) performed the practice and analysis of the ODL by their own experiences and by screening of other institutes and institutional networks operating mainly as the members of the international networks EDEN and EADL. As an essential element of the methodology of research we issued an on-line questionnaire, which examined the legal and financial surroundings, the constitutional structure, the sectors of operation, the practice of network and the expectations of the participants. The valuability of the answers was provided by a 90 % delimited multiple-choice test (http:\\www.gdf.hu). Answering the test was voluntary and at some certain questions more parallel answers were allowed depending on the content.

2. Representative sample

The questionnaire was completed by 67 participants from 24 European countries and 2 from non-European coutries so the dimension of the sampling has reached the critical mass that tuned to be suitable for analysis and to draw some conclusions from it.

The answers equally represent the circle of countries from inside the European Union, that of those who are very close to joining and also the countries that are still outside from the EU.

This is an important point of view if we accept the proposition that the ODL is a very effective method of the cooperation of societies inside and over nations, the coordination of resources, and creation of professional communities.

2.1. The national legal environment of ODL

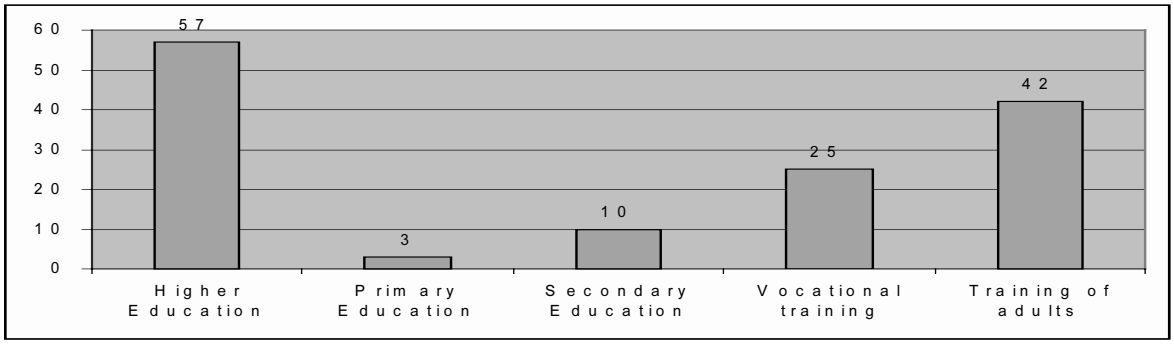
According to the 44,8% of the answerers there is no ruling law for ODL in his country.

The significant scale of the data leads us to conclude that there is a correlation between the lack of regulation and the „laissez-faire passer" dominance registered in model typology presented later. Its main characteristic is the small governmental role in the organisation, financing of ODL. Three answering institutions operate in elementary education, too.

The data expressible per thousand is still worth being taken into consideration and being discussed as a pedagogical test accepting the face-to-face need of preparatory education based on traditional methods and the primarily knowledge-renewal, knowledge synthesizing mission of ODL.

2.2. The operational sectors of the ODL

The theories concerning the fields of the application of the ODL were proved by the answers. The fundamental formal educational sectors of the ODL are the higher and secondary education and the vocational training. The ODL also appears in a significant measure - 61% of the answers - in adult-training outside of the educational system. This fact supports the practical realisation of the idea of lifelong learning : the training in the educational system ending at higher degree can be considered as initial. Its main objective is to establish knowledge and to prepare the students for a career which can be realized by harmonizing working and further education. The ODL is a rational tool and frame of the idea of lifelong learning, which - in contrast with the traditional training - can satisfy the increasing demands on the development of the intellectual resources.

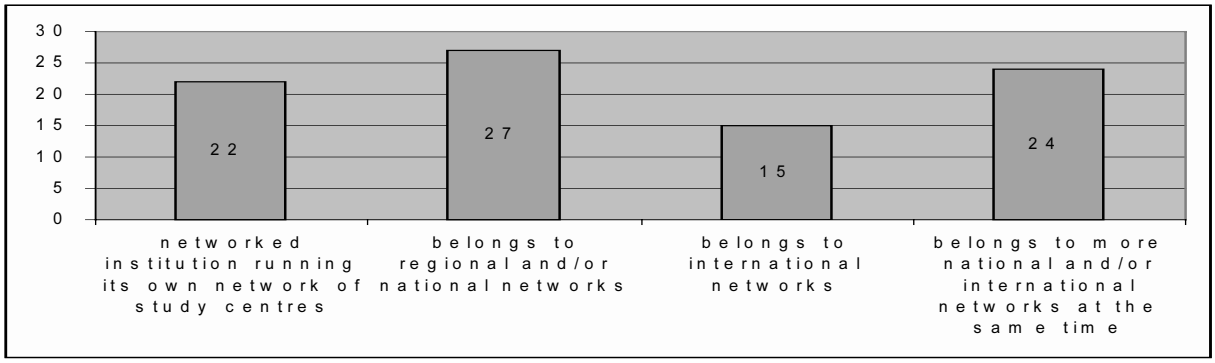


2.3. The national organisational forms of ODL

We defined the national facultative ODL organisational categories following Zeller′s (1995) model typology. On the basis of the division and redundancy of the answers it can be laid down as a fact that there is no pure national model formation in the circle of the interviewees. Nevertheless the low collaboration willingness of governments in the organisation and financing of ODL can be considered significant.

2.4. The network typology of the individual institutions

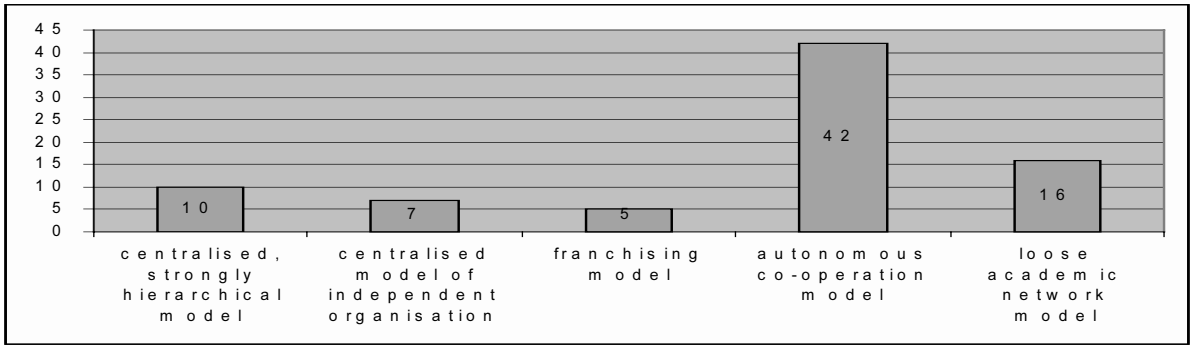
The variance of the answers measurable in absolute numbers is the most equable by this question of the given typologies. However, the 32 % of the answerers is not connected to any national networks, respectively do not operate an own network consisting of study centres, 13% is connected to national/regional/international networks at the same time. It is characteristic for the diversification that the interviewees considered important to give a more accurate answer mostly here.



2.5. Effectiveness – preference investigation of the models

The interviewees could choose among five desirable models considering the way of the division of labour and the legal status of the network members. The "Autonomous co-operation model" mixing the legal, professional, cultural and financing competencies in the most democratic way, has been considered desirable by 47 % of the answerers. Inclusive of the 18 % voted on the "Loose academic network model", which prefers the exchange of professional and scientific experiences among the members, 65 % dominance of the desirable network model can be demonstrated.

Altogether 0,06 % chose the "franchising model" on the other side of the pole, which strongly restricts the organisational, professional and financing autonomy. 17 % of the answerers considered one of the centralised models emphasizing profile purity, maintenance and improvement of competitiveness through financing as the most efficient ODL network form.



2.6. The value of the connection to the network

We studied the value of the connection to the network in 3 main groups with many aspects on a 5 grade scale. The participans considered the following to be especially significant:

- The possibility of changing scientific and professional information (from the point of view of information and cooperation).
- The achievement of financial assistance (from the point of view of commerce).
- The individual development, the improvement of the quality of knowledge and service (from the point of view of the development of the institute).

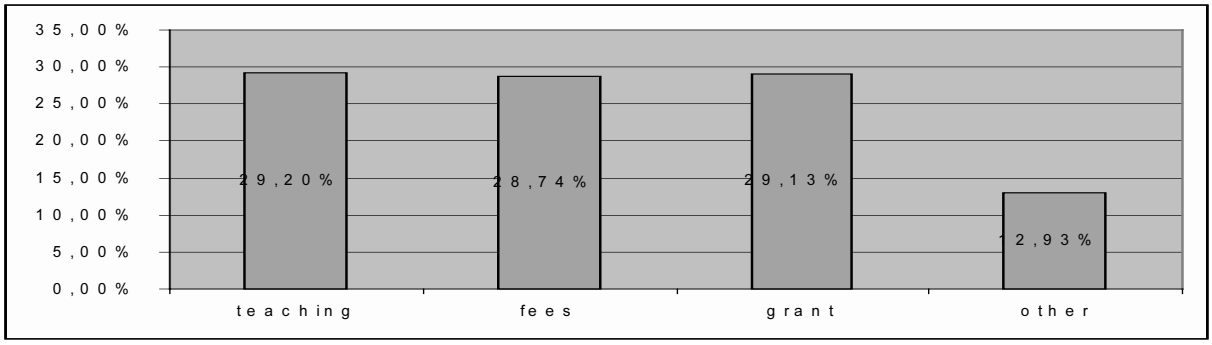
The advantages of connection to the network can only appear in the professional and qualitative improvement of the institutes if the network organization - having organisational and professional influence and providing high quality performance - is able to operate for a longer time.

That is why - besides the material advantages - the answers express precisely the advantages of the fulfilment of the professional image and potentional by the network.

2.7. The financial resources of the institutions

Institution financing is supported by three main resources in the circle of the interviewees: incomes from education, tuition fees and external support of similar size (about 28-29 %).

90 % of the income coming from external support is governmental. National and international research, development projects, local governmental support were pointed out as additional resources of incomes.



2.8. Examples for good network practice

The survey is difficult to be evaluated because of the answers given to the open questions; but its pragmatic chapter still 39 % of the answerers relate their good experiences gained in the field of the operation and organisation, of ODL. There are reports on transnational collaboration primarily at large, comprehensive European free universities, distance educational associations and through student-teacher mobility.

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TELEROBOTICS FOR ENGINEERING EDUCATION

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Introduction

It is an important and main part to get experience with the behavior of real machines and real robots for students in mechanical engineering sciences. It is necessary that they can work by themselves with these machines and get their personal measuring result. They must do their own calculation with these measuring data. Only in this way they understand the aim of their work and they learn to use all the knowledge they got in the study up to this moment.
In normal laboratory work there is one tutor and a group of students. The tutor and only a few students are working, the other students are watching the scene - or doing something else. And if there is an explanation at the board all of the students nod. But when they have to achieve work by themselves they are unable to.
Only if you have labs where students can work by themselves they will gain the experience how to work. But with real robots it isn't possible to do so. And with simulated robots? A simulation, not even a 3D-immersion-simulation, can't substitute the experience with real machines in a real environment. Of course a simulation and all the multimedia technologies may support the learning process but students must sometimes see and work with reality.
Based on real laboratories with robotic laboratory equipment for automatic control systems and machine tool virtual laboratories are developed. Laboratory experiments can be carried out in a real laboratory by remote control over the Internet:

Network "Virtual Laboratory" (VVL)

VVL is a joint project of Universities of Applied Sciences in Baden-Württemberg (Southern Germany) i.e. the Universities of Aalen, Heilbronn, Konstanz, Ravensburg, Reutlingen and the University of Tübingen. There are virtual copies of real laboratories in the Internet. These laboratories concentrate their multimedia and telecontrolled experiments in the fields of automation technologies, robotics, machine tool technologies, image processing, computer sciences and communication technology. These experiments are both telecontrolled and teleobserved in real laboratories. They are carried out as real process. They are part of the study of engineering and computer sciences. Students use them to improve their knowledge and experience. Lecturers use them for teaching. According to their design the laboratories also serve research.
All handling activities which have to be done in real laboratories by manipulation of push buttons and all observation operations of displays or of real sceneries are possible in a comfortable way over the internet.
Push button of control panels and display of the machine tool equipment is visible on the client computer screen – predominately in a better performance than reality. All push buttons can be activated by a mouse click. For observation of scenes webcams are used. They are fully controlled by the user. So at any time one can have a overview of total scenery or see some details in dimensions smaller than 1 cm. One may detect the name of plates of machining components such as drivers or sensors. It is just in such a way as people have their eyes in the midst of the experimental equipment. With special cameras we realize the view in a microscope over the Internet.

The virtual and telematic robot laboratory

The virtual robot laboratory is a copy of a real laboratory of Aalen. In this manner it is suitable to deliver the know how for the presentation a virtual robot sceneries, for the virtual robot programming as well as for real applications, for calibrations of robots and robot tools and for robot processes. The real robot laboratory can be controlled by telematic methods and thus the laboratory may be used as well as a global laboratory and as a local laboratory.

The education of engineers and of scientists in mechanical faculties of universities involves for example fundamental knowledge in kinematics, coordinate systems and in robot coordinate transformations. To learn this you do not need a real robot laboratory nor a virtual robot. All you need is a good book or a good lesson in the usual way. But visit of a laboratory or access to a virtual scenery gives of course a supporting moment. Interactively moving robots on a screen may accelerate the learning process.

For educating engineers we need more than only understanding of theoretical knowledge. The students have to learn solving problems in a complete manner by the choice of the best way with the best systems and the best instruments, and all of this under the notice of constraints. The constraints in robotics are for example limitations in the moving angels, in permissible loads, in the approach to the operating point etc. Sometimes there is only a hanging cable which prevents an operation from working properly and it is impossible to notice this only with a virtual system. The manufacturing processing parameters are responsible for the results. Only in some rare cases the simulation systems are able to deliver correct result. But even then a student must be able to compare the computed and virtualized results with real results. It is up to them to learn the amount in which things may be accepted and where they must lift their fingers when theory and practice drive apart.

Besides basic lessons on the screen with textual element figures, algorithm, questions, answers and milestones for self education in the virtual and telemanipulated robot laboratory, several exercises are prepared for:

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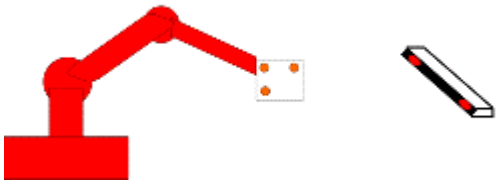
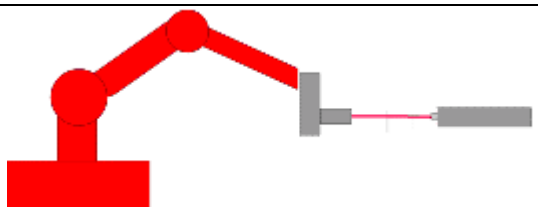
<td> 
testing robots with regard to the accuracy in positioning*</td>
<td> 
testing robots with regard to the linear behavior*</td>
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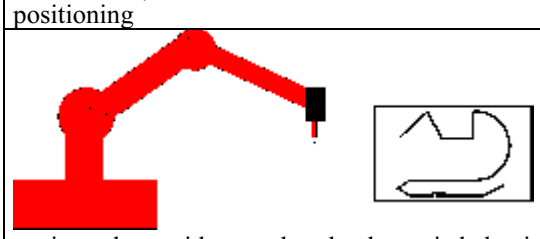
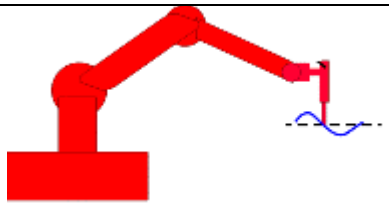
<td> 
testing robots with regard to the dynamic behavior by moving along special test paths*</td>
<td> 
testing robots with regard to the dynamic behavior in a closed sensor control loop</td>
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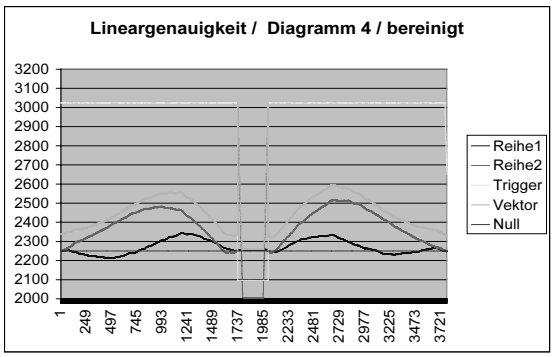
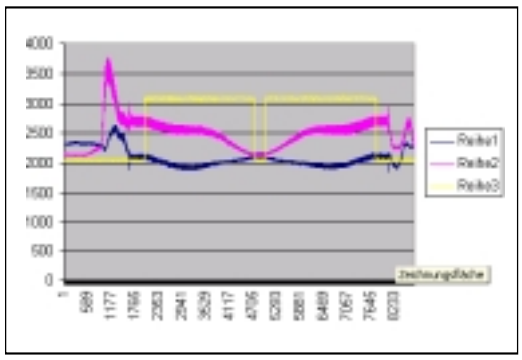
Parts of these exercises will be prepared in various gradiations of difficulty for different user groups, i.e. technicians in further education, students in lower and students in higher semesters.

The main idea of this exercises is that the student may learn the techniques of robot programming in general situations and in special cases. The main approach is to give a feeling about real robot behavior to the student. For this, the laboratory must be a real one and the robot must be controlled via Internet with telematic services. The student should see the robot behavior in dependence on parameters set by the student himself. He should see with his own eyes and through fully controlled cameras.

* (in accordance to ISO 9283)

The student can evaluate his own measuring data and generate new parameters in the robot program for optimizing. In addition to pure knowledge the student will also get the experience for robot behavior. Most of our students appraise the calculation in Microsoft Excel.





The main advantages for the user

- Use the laboratories at any time: every student can do his own lab work when he wants (during his high productive time)
- every student has his own robot
- every student has his own measuring results
- every student can do his own work in his own learning speed
- every student can use his personal state of knowledge
- every student experiences the usefulness of the multitude of small packages of knowledge he got and he learns to use them by himself
- every student can carry out experiments form any place in the world equipped with an Internet communication facility
- every student will be well supported by all the multimedia possibilities as:
  - White papers
  - Videos
  - VRML-simulations
  - Video conferencing with experts and professors

The user doesn't have any risk of accident. For example one must not set one's feet in the actual robot cell. On the other hand one can not experience the real feeling for the responsibility when starting a powerful machine tool or robot. One also avoids the real experience in feeling oil, dust, vibrations and

real machine noise. Thus we do not loose the need for real laboratories because they have the tactile experience as well.
Beside the direct benefit of the virtual laboratory with both simulated and real experiments, the VVL-project promotes to all participants:

- seeing the advantages and disadvantages of distance learning
- getting experience with all the ups and downs of small and wide band communication channels
- gaining experience with the TCP/IP protocol

So the VVL project promotes for all producers and users an opportunity for learning all aspects of the new communication technologies. In addition we see that the conventional face to face teaching methods can not be transformed directly in a virtual distance learning course. We need:

- Reliable control software for actual machines
- Safety sequences of access to computers and machining equipment
- Safety requirements for all parts of tele-used laboratories
- Professional designed web-pages
- Well-prepared descriptions and didactics of the experiments with all details in a multimedia presentation, i.e. text, graphics, animated 3D-graphics, Videos, animated GIFs, VRMLs etc.

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APPLICATION FIELDS OF MULTIMEDIA EDUCATIONAL MODULES FOR HIGHER EDUCATON USING CELL BIOLOGY AS AN EXAMPLE

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Introduction

Life sciences are considered a key to scientific and economic prosperity in the 21st century. Therefore schools, universities and the industry have a strong demand for audiovisual media for teaching purposes and the public need explanation and communication of scientific results. On the other hand, large quantities of valuable images and audio-visual media in the field of life sciences are produced constantly in universities and scientific institutions throughout Europe, thus creating a unique supply situation. IWF Wissen und Medien (Knowledge and Media), in co-operation with the Bio centre at the University of Frankfurt, the MMcD GmbH and the IAS GmbH, compiled, published and investigated the utilisation of a comprehensive media archive for Cell Biology from 1998 to 2002. This was conducted in the context of the BMBF's (Federal Ministry for Education, Science, Research and Technology) funding for the further development of the scientific and technical book for multimedia knowledge representation. The project's objective was the progressive preparation and application of interactive knowledge representation in Cell Biology – a modular media and communication service.

Description of the three didactical an pedagogical approaches

The media tested in this survey comprises approximately 150 modules. Thematic foci are chloroplasts, photosynthesis, mitochondria and energy metabolism. Seventy percent of the media are linear videos; the others are interactive to varying degrees (programmed with Macromedia Director). For didactical and pedagogical reasons, the media are offered on three different technical platforms and in varying combinations for the final user.

The four-part Cell CD-ROM Series combines modules on individual subjects. The modules are embedded in a uniform user interface with differing access ports. Glossary, Quiz and Help texts round out the offering. The CD-ROMs have been programmed with Macromedia Director and run on Windows and Macintosh operating systems. They have been optimised for single user utilisation. The most extensive experience exists for the first CD-ROM in the series "The Cell I – Life from Light and Air – Chloroplast and Photosynthesis". A laudatory speech by Professor Dr. Gerhard Zimmer in the context of the European Media Competition Comenius 2000 describes it as follows: "The multimedia CD-ROM has been made for pupils of the upper levels in grammar schools and for students in the introductory semesters of the biology curriculum. It should complement the existing educational offering but not replace it. An animated audiovisual introduction to the plant cell presents the latter's most important components. Via sensitive images one can deepen one's knowledge of the function, structure and development of the individual components interactively. The information is extremely well illustrated with 3-D animations, moving pictures, short films, and the most important terms and definitions are presented audiovisual." [1]

The Cells – Media Library for Cell Biology is a digital media collection. Video clips, computer animations, 3D models to these topics and interactive experiments on Cell Biology in hyperlink structure have been implemented and can be accessed. Most of the modules in the CD-ROM Series described above are also available in the Media Library. The Media Library is used in local networks (Intranet) in educational institutions, such as schools and universities. The Media Library CD-ROMs are installed on an intranet server by copying them. Each client who is networked to the local server can now use this media offering. Since the programming was performed in HTML, every computer system (e.g. PC, Mac) and every operating system (e.g. Win 95/98/NT/2000, Linux, MacOS) with an appropriate Internet browser (e.g. MS Internet Explorer, Netscape Navigator, Opera) can be used.

The “cells.de” online service contains digital media in Internet quality as well as additional information for university and school on the subject of Cell Biology and molecular biology. Collections of links exist to Learning & Teaching, Dictionaries, Documents on Experimental Exercises, Journals and Occupational Information. Various searching aids and a lexicon are integrated, as are FAQ (Frequently asked Questions) and a guest book. Digital media are the main component of “cells.de” in the “Media Archive” menu item with videos in RealVideo and QuickTime Technologies, 3D objects as QTVRs, computer animations and interactive learning modules in Shockwave format. These digital media are available in full-length versions. They are intended for research and for teaching and learning at university and school. The Media Archive’s content and structure essentially correspond to that of the Media Library; however, there are no high-resolution videos.

Feedback of Users

The investigation of the media offering’s application fields is based on reports on its use in classroom instruction, reviews in trade journals, reports by specialists, recognition at award presentations, assessment of log files from cells.de, assessment of links on cells.de, entries in the guest book from cells.de and experience with marketing. The Cell I CD-ROM was mainly received positively in the specialist world:

- “This is the best interactive CD I have ever seen. It has the right combination of theory and applications… Overall, I think this is a valuable resource”[2].
- „I can recommend this CD-ROM as an excellent instruction medium, not only for schools and undergraduates, but also for graduate students of biology and related sciences...“[3].
- A Cell biologist of the Department of Anatomy, University of Aarhus, Denmark: “The graphics and short footage is plenty and very impressive, and at no point did I think that there was too much text. This makes the CD-ROM a both entertaining and quite educating experience.”[4]
- “Taken as a whole the present CD-ROM is an ideal complement to biology instruction or to review the entire subject of photosynthesis in senior grammar school forms (upper grades) or at the university level.” “[5]

The Cell I CD-ROM has won three media awards. In the laudatory speech for the Europrix Award and the Comenius Medallion the multimedia quality was primarily referred to: “This is one of the highlights of the program, to be able to combine three-dimensional units, both abstract and specific, where the user can dissect plants for their cell components, then examine them further through microscopic enhancement. "The Cell I" is representative of what a high-quality, content-driven educational product should be.”[6] “The possibilities of multimedia are used in an exemplary manner to make basic knowledge of the plant cell truly multisymbolically accessible to the learners’ interactive access. The learners can also perform laboratory experiments, the so-called key experiments of biology, in a virtual laboratory. Due to its exemplary design with regard to content, its didactic conception and its multimedia realisation, “The Cell I” is awarded the GPI’s Comenius Medallion 2000.” [7]

The Cell I CD-ROM has not been optimised for use in classroom instruction, but was still used in the context of the school. The most exhaustive utilisation report is in a written term paper in the context of the Second State Examination for the Teaching Profession in the Secondary Stages of Education I/II (Sek.I/II) in Biology.[8] Theo Schürholz investigated the Cell I CD-ROM in it and conceived a series of teaching units on photosynthesis. The fact that the CD contains “a large number of excellent images and film sequences” is considered positive. Via the interactive elements the pupils can control molecular reactions and experience them. However, the following was criticised: “The individual study units have indeed been didactically prepared, but a didactic-methodological concept for its use in classroom teaching. Thus, the CD is multimedia material collection, which must be supplemented by appropriate worksheets and adapted to the respective teaching conception.” The reason for this is also mentioned. “This is due to the fact that the CD is primarily conceived as Edutainement for use in the afternoon hours. However, the IWF is preparing a version especially for use in the classroom, which is modularly structured and thus can be utilised more flexibly. The Cell I CD-ROM was also comprehensively investigated in the context of the Infoschul 1 Project.[9] Its use in classroom teaching

in Sek.II was tested by biology teachers, system operators, pupils in the Preparatory Biology Course, Grade 11, student teachers and the InfoSCHUL Project Director:

- "The CD is too playfully designed for appropriate use in classroom teaching. The pupils are indeed motivated to "click around" in the contents, but an intensive examination of the material does not occur.
- The standards of the different parts of the CD differs much too greatly Individual components have middle school level (class 7/8); others, in contrast, are appropriate for senior forms (higher grades).
- "The Cell I CD-ROM" is severely deficient in that it cannot be installed in the school network, and thus must be installed locally in every individual computer. => This CD is only appropriate for use in schools to a very restricted extent, because the supervisory effort required is too great!
- "The experiments are only slightly appropriate, or not at all suitable, since some of them are not demandingly interactive enough, others are too playful. Real, interactive simulations are lacking, but these would be exactly those that would be urgently required for use in classroom teaching in Sek.II.
- A brief assessment of the "cells – Media Library for Cell Biology" CD-ROM gave better results. "This CD-ROM is a modular presentation, which the teacher can use for instructional purposes! The CD can be used on the school network's server with no problems!" A comprehensive assessment of Media Library is to be performed in Infoschul Project 2 in 2002.

September 2001 was selected as an example for the use of the cells.de online service. More than 37,000 people, who spent an average of 5 minutes looking around, visited our Website in this month. Approximately 60% of the users are from German-speaking countries, circa 30% from the USA. Users from Great Britain and Canada followed in much lower numbers. A total of 2,500 visitors used the website several times; more than 1000 visitors stayed more than a quarter of an hour. Approximately 20,000 video and multimedia objects were downloaded or streamed; this corresponds to about 3 gigabytes of data. A total of 100 links, which lead to cells.de or its individual pages, were found. The majority of the links are located in the link collections to the subject areas Cell Biology, biology, biotechnology, genetic engineering, information for teachers, multimedia products so similar topics. A few pages "promote", e.g., the Cell I or II CD-ROMs. Nearly ¾ of them are German/German-language pages. Only 28 links are located on international (primarily English-language) pages. It is particularly interesting to examine how many users accessed cells.de via these links. In October nearly 1500 visitors were guided to cells.de via the website of the University of Arizona *The Biology Project* (www.biology.arizona.edu/cell_bio/cell_bio.html*)*. The Biology Project is used for instructing students and in some places links led directly to the thematically appropriate videos at cells.de. The Website www.cellbio.com regards itself as a resource for cell- and molecular biologists. More than 800 users were directed to cells.de by www.cellbio.com in October 2001.

From January 1998 to December 2001 we had 50 entries in the www.cells.de guest book. Some entries were from biology teachers:

- "I just discovered your pages and I am extremely enthusiastic: I am a biology teacher at a comprehensive school and above all intend use the interactive experiments on photosynthesis in my lessons."
- "I am a science educator in the States. grades 11-12. This website is a wonderful tool to use to aid the students in visualising all the different cell types!"
- Pupils wrote about half of the comments– their visits were not always voluntary: "I find your page totally boring; we have to look at it because our teacher "ordered" us to."
- " Hello Cells! This site is really cool; it really helped me a lot in learning or catching up on material that I had missed. Keep up the good work!"
- At least help with my homework should be possible: "Could you please help me write a comparison between blood vessels and sieve tubes. I am in the 9th grade and need it really fast! Waiting for your answer!"
- Students and lectures at universities also use the website, but normally do not write anything. With some exceptions:

- „Dear Colleagues, Congratulations for your work and especially the support for the education community. I'm using your site as a reference for my Cell Biology Classes. Go ahead with your project. Warm regards, Francisco Carrapico, Dep. Plant Biology, University of Lisbon."

Besides the self-marketing by the IWF, license agreements for the CD series or parts of it have been made in Germany, Italy, Denmark, Netherlands and the Slovenia. Nearly 20.000 copies were sold by the IWF or its publishing partners.

Discussion

The requirements of the user of multimedia educational modules are complex and not always readily predictable. Although less empirical data was available for this investigation than reports from users, some statements can still be made regarding the application fields of multimedia educational modules. The CD-ROM series is obviously appropriate for self-study by pupils, students and interested laymen and –women. Contrary to the intentions of the editors they were also used by teachers or lectures for presentation in the classroom. In many cases this was successful; however, systematic investigations were able to reveal the weaknesses of these latter fields of application. There is not yet sufficient data available for the Media Library for Cell biology, which was developed for presentation in the classroom. The cells.de website, which to a large extent only provides preview images from the media modules, is obviously frequently being used as an adequate information source for knowledge acquisition, although it was primarily conceived only to accompany the CD-ROM series. Both pupils, teachers, students, lecturers and interested laymen/-women use the site. Both the access numbers for the website as well as the sales volumes of the CD-ROMs indicate acceptance of the media service all in all.

Perspective

In co-operation with the L3S (Learning Lab Lower Saxony) in Hannover and the Faculty for Applied Media Science at the Technical University in Brunswick (Professor Christian Floto) individual modules from this knowledge pool are being tested for their media-didactical efficiency in Project Vase. To allow further concrete investigation of its use in higher education, we plan to deliver and test more than 60 chapters, containing 500 multimedia objects, online, using download or streaming, or delivered offline, on CD-ROM and DVD.

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NOTEBOOK AND WIRELESS LAN SED FOR POSTGRADUATE LEARNING

Johann Günther, Danube University Krems

The new medias are changing many jobs. Some of them are not longer necessary. People, working in these branches have to cope with the changes and have to change themselves. In many respects our society is more mobiler than in past years:

- quicker change of place of living (home and working place)
- mobility within the hierarchy (change from manager to specialist and vice versa)
- easier finding of the location of an emloyee by telecommunications
- working nomades without an office
- homeworker
- several kinds of job during one career.

The education system has to consider these facts, concerning the content and the method of learning.

1. Mobility of the society by technology

Technical tools allow us to be reached nearly everywhere. This means a greater independence of locations. The time factor becomes more important than the location. Thus effecting our social togehterness. "Electronic medias are eliminating our social structures. They create a new social universe without no possibility to retire from the world. The traditional connection between physical destinations and social environments are missing. We are not longer living in a region, we are living in a communications system; we are not longer living in houses; we are living in programme segments. The digital nomads are sitting in self-designed locations in front of screens and are surfing through universes and times."

The factor time is also very important during the studies in Krems. The students normally have a full-time job. Time is more relevant than money. Mobile tools help to reduce the absent time from the job or combine working place and studing place by telecommunications systems.

1.1. Social mobility

For many decades people are forced to live in their respective social classes. It was very hard to move to the upper class. Agriculture, as above mentioned, represent employment for more than 50 percent

of the population in the 20th century. This situation changed radically in the last 50 years. What happens with the people working in the agricultural sector? The process started according to certain structures.At the end of 1970 there were no important changes. The social way up was very difficult:

- One fifth of the workers were farmers
- More than the half of the workers came from worker families
- 40% of employees and civil servants derived from employees and civil servant families

The reduction of industrial production caused a situation for the workers similiar to the development of the farmers 150 years before. Many farmers changed to the industrial production. At the beginning of the 21st century they were forced to overthink the situation. The rules of economy did not accept a normal change like industrialization. The requests for the information employees were different and need more education. A farmer was able to learn his job of an industrial worker in a short time. But it was not possible to train quick a worker to become a software specialist. The past showed us a constant upward trend in the social field. In future we have to consider that a social downward trend will be unavoidable. Further education on a continous basis is changing the status of people.

1.2. Increase of old people

The percentage of old people in developed countries is rising. In Germany, more than 50 % of the population will be older than 50 years in 2030. The basic question is, how can a society with a majority of old people be further innovative? Until today the young generation was the majority and put pressure on cultural evolution and changes. Is it possible to remain the level of innovation in a society with a minority of young people? Is this a possibility to retrain older people to close the gap to the younger ones? In any case people are remaining mobile by learning. Getting older by being mentally mobile. In the field of informatics it was recognized the first time, that the Western world has a lack of younger people. In the next years more jobs will follow. Two trends are overlapping itself:

- number of working people is decreasing
- higher qualifications become important

By the increase of the percentage of old people innovation is lost. How is it possible for a society to remain innovative under such circumstances? How looks the political development when the majority of parlament members are pensionists and they are determining the amount of penison payed?

The average age of the students of the "Telematik Management" was more than 40 in the last years. People, with an age over 50 went back to learn again. The were not trained in how to learn effective. The new teaching methods help them to cope with the younger ones.

1.3. "The new work"

In 1950, more than 50 percent of all workers are engaged in the agricultural sector. Today, only 3 percent are still working there. Nowadays, more than 80 percent are employed in the service sector.

For Austria this means:

business sector	1952	1961	1971	1980	1992	2000
agricultural sector	21.9	21.3	13.5	10.4	6.8	3.0
production sector	37.3	41.7	42.0	40.5	35.7	30.0
service sector	37.3	41.7	42.0	40.5	35.7	67.0

percentage of the several businsess sectors in Austria (*source: Österreichisches Zentralamt)*
figures in percentage of total employment

The human being of the 21st century has 50% spare time. Further education and learning is included. The distinction between working- and spare time it not so clear. The society reached a status compareable with the one of the 19th century.

2. Technological preconditions

Technological preconditions for telelearning are already given for a long time, but could not be realized because of financial ressources. Liberalization and privatization of telecommunications brought lower prices. Moreover, people have more money available for this sector. In 1950, more than 50 percent of the income was spent for food. In the year 2000, only 20 percent are necessary; irrespective of the available income. For telecommunications people spend a multiple compared with the after-war years.

expenditures	1950	1985	2000
food	51%	27%	18%
(thereof 5% for health and hygiene)			
clothing, furniture	17%	16%	12%
living, heating	9%	18%	28%
others	23%	39%	42%

(thereof more than 20% for cars and telecommunicationsd-telefon, internet ecc.)

Nowadays, the media telefon can used by every inhabitant. The trend goes toward mobile phone. At the beginning of the 21st century every Austrian - being able to listen and talk - had more than one mobile phone. Moreover, the time of usage is increasing:

2000	2001	2002	2003
877	1,120	1,360	1,580

average time of phoning in minutes (source: IDC)

Internet penetration is expexted to reach a position within the next years:

YE 2000	YE 2001	YE 2002	YE 2003
2.790	3.350	4.230	4.800
34.40%	43.50%	52.00%	58.90%

figures in million of persons, percentage in relation to total population (source: IDC)

Within the next years a combination of internet and mobile phones is expected due to the increase of larger broadbands in the field of mobile networks. UMTS is a data service running via telefon networks. Data and voice are equally transmitted. A study at the Donau-University during the course "Telematik Management" tested this situation under consideration of the expected developments.

3. Mobile Education System

Service systems are subject to quick changes. Education has to consider these changing conditions. It is unavoidable to learn continously. Only 20% of the products of an electronic company will be the same in 5 years. New technologies will be used in the exent of 80%. But 80% of the staff of today will also work in this company in 5 years. Only 20% of new employees are joining the enterprise. Education in school can offer only 20% of "right educated employees". The electronic company itself is responsible for retraining of the 80%. Retraining and further education has to be the interest of the economy. The exent of such a "lifelong learning" exceeds a dimension, so that companies cannot do this job alone. But the federal systems are not able to handle this situation. Communities, like the European Community could find a solution - like for unemployment. Countries, communities and worldwide organizations have to provide resources. In 2005 Austria will have a lack of 165,000 qualified workers.

The importance of the level of technology is increasing for the competitivness of a region or a country. Low production costs and low personell costs are not longer enough, if telecommunications and education in insufficient. E-business and related logistics needs infrastructures for telecommunications and informatics.

4. Postgraduate course "Telematics Management"

The Donau-University was founded in 1995 as a postgraduate education facility with five institutes. The institute "Telecommunications, Information and Media" started at the 1st of April, 1996. The reason for the foundation was a study of ZSI (Centre for Social Innovation) made in 1995. The development of information-and communications networks brought a national and international initiative along. "Telecommunications", "Information" and "Media" need a common institutional sight. Knowledge as a product can be realized with the latest telecommunications technologies. The institute "Telecommunications, Information and Media" (TIM) represents an international centre for convergency. "Convergency" stands for the fusion of telecommunications, information and media.

The postgraduate course "Telematik Management" trains "generalists" in this field within 7x2 weeks. More than 100 students have finished it with the MAS (Master of Advanced Studies in Telematics Management). The short one-year study goes along with a high intensity of learning. Technological items should help to "easier" the studies.

5. The usage of notebooks

Besides normal lesson rooms a special sector with PC equipment was necessary. So, two rooms are permanent reservated for the course. In 1998, structured cabeling was installed allowing online higher broadbands. In Winter 2000/01 the first "Notebook-class" started after some tests in Summer. Every student received a laptop at the University for the duration of the course. The laptops were bought by an auction. High-end terminals were necessary. Toshiba Type TECRA 8100 were chosen at the end. For every laptop an insurance was signed to guarantee working. Cabeltron and Kapsch AG made tests in Summer 2000. The building of the University was one of the first reinforced concrete buildings at the beginning at the 20th century. On the one hand, the density of the kind of builiding was a disadvantage because the range of radio was low. On the other side, "shielding" for forming of smaller radio areas with larger ranges was better off. The LAN for the course offered 25 students 3 access points, allowing 3x11 MB per seconde transmission. This is equivalent with a netperformance of 5 MB. For the local wireless LAN network cards according to IEEE 8702.11b were used. In order to guarantee the students mobile access to the server, mobile GSM cards for transmission were available. But they were used not so often.

5.1. Used tasks

In Summer 2001, the first course with laptops was finished. In Autumn 2001, the second course began with the same technical equipment. The experience of the first time was used. The notebooks were used for the following tasks:

- place for scripts
- e-campus: The e-campus is a part of the homepage of the Donau-University. It is a databased system for students. Each course offers its own database. Access to the e-campus is possible from internal and external facilities. Access is limited for a certain number of students and is added with a security system. The offer of the e-campus is very large. Menu from the mensa, common activities and discussions. But mostly it is used to store the seminar documents. Since the introduction of wireless LAN and the laptops all seminar documents are stored digitally as PDF format.

- Evaluation: The term "evaluation" derives from the latin word "valeo" (have a value). In the 14th century the terms "avaluer", "évaluer" and "évaluation" were used in France. England assumed the terms and in the 18th century. The terms could be found also in the English language. The German language in the Middle Age had the terms "valor" and "preis" or "wert". "Evaluation" (to determine value) was used later. In the 19th century evaluation was used for a study to determine the value of the school system, they so called "Scale-Books". During the 20th century - 1960 to 1980 - the evaluation of school systems was very popular. The increased globalization and internationalization trend tried to find ways to combine education systems on a global basis. The Donau-University uses evaluation for quality improvements. By evaluation studies on a regular basis the offer of learning facilities should be improved. Evaluation is a "two-way-evaluation" Students are evaluated by teachers and teachers are evaluated by students.
- e-literature
- e-learning: outsourcing (Power Point)
- visualizing of the content (ARCS)
- Telelearning: Telelearning is nothing new. Already the apostels sent letters, which are nowadays used for reading during ecumenical events. These letters are 2000-year old "telelearning" instruments. For the postgraduate studies time is an important factor. As far as possible contents can be learned by homework. But nevertheless, working people are preferring the lectures. Homework is for many postgraduate students not so efficient. For reaching of a common level some tasks have to be done by homework. For the preparation of presentations knowledge in power point is necessary. Introduction in this programme has to be the duty of the University. Therefore, the students receive CDs and tutors can be asked via internet. All students receive the same programmes to avoid a classification of them. Beginners start to learn, advanced develop the knowledge and the specalists analyze the structure of the programme.

- group work - data transfer, document-sharing
- mastertheories digital
- tests
- added value for the students

6. Experience

- Mobility of students and organization: Laptops improved the mobility of the University and the students. Students are able to handle the team works more efficiently. They are not forced to meet eachother. Administration of the University is much more flexible in coordinating the available rooms. Students and teachers are allowed to sit as they want because cabeling is not necessary: normal rows, circles or groups can be formed.
- Increased presence: Students are present in lessons, which normally they would decide not to share. In former courses, presence of students was not so high. The laptop class has a high presence. If students are not interested in one theme during the lesson, they work with the laptop. Besides working they can listen to the lecture.
- Interaction of the teacher: The lectors are faced with new teaching methods. Students are sitting behind their laptops and a teacher don't know whether they are joining the course or are doing other things. Teachers are forced to show more interaction to motivate the students. Eye to eye contact is not always possible.
- Interactivity: Students receive their literature before the lesson starts. Many teachers ask the students to read the books before the class meets the first time. Thus is changing learning completely. During the lessons, the students tell which parts are not clear and only this themes are discussed. Lessons become an interactive process, problems are worked out together. So the teachers are faced with a new situation
- Copy of the literature: Except one case, all lectors provide their literature digitally. The institutes are obliged, to save the copyrights in a way, that only students have access to the material. This is a great challenge for the technical side. Students are very pleased that all of them have access to the same literature at the same time. Each course creates an index which easiers the search for the right books.
- No PC-lab: The Donau University has to less lecture rooms. Wireless computers help to solve this problem. No additional room and network was necessary. The students have access to the net any time. Lectors can use computers during the lessons without planning it or additional support.
- Paper: The University offers not longer manuscripts in paper. This leads to a reduction of about 20 maps with paper per student. A calculation showed that the laptops have an amortization of only one and a half year due to copy costs not longer necessary. he students must not carry the maps. Disks are sufficient and can be transported in the handbag. A second study showed that most students are learning in front of the laptop. They need no hard copies. Only older people prefer hard copies. The age between laptop reading and papercopies is around 40. Younger people tend to a "paperless office". The University is not longer responsible for printed literature.

7. Future

A study at the University Vienna showed that the acceptance of new medias is very high among the students. They expect such instruments as standard equipment.

Claudio Dondi, SCIENTER (Italy) worked out a future scenario as a part of an EU-project. Teachers have been considered in this study. It showed, that the attitude of the lectors changed:

- 80% believe that telecommunications will become an important part in the field of education and
- 80% said that telecommunications is a reasonable investment for future developments.

If "teaching systems" should become a "learning systems" some basics have to be adopted. Lectors must forget their dominant leading position. They must promote learning together and have to motivate their students. Teaching and learning must become one. Teachers will also learn vom students. The Donau-University combined several types of education systems by network during an

EU-project: normal and postgraduate school types. The result was that different students are able to learn from eachother. Adults are able to learn certain themes quicker than children. Children from an agricultural school are the best to explain how to cultivate potatoes. This is the proof that cooperation between different learning groups delivers good results, irrespective of the age of the participants. Older people are learning from younger ones, and vice versa. Networks promote this fact. The participants have contact via screen and can discuss and solve problems "face-to-face".

We are at the beginning of learning with these new technologies. Until now teachers are working autodidactic.

The "Telematik Management" course is a postgraduate study for adults. The results are not necessarily the same like for normal schools with children. A test with normal students - average age of 20 - had to be cancelled, because they had other expectations compared with adult students with an age of 40. The quality of learning methods is much more important for adult persons.

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SMART_EDU - SATELLITE MULTIMEDIA RAPID TRANSFER OF EDUCATION

Dipl.Ing. Dusan Statelov, Managing Director, Main Data, s.r.o.

Abstract

Currently majority (over 80 %) of Distance Education Courses are paper based [1]. New Internet based trainees there are limited to text and static graphics in a best audio streaming due to connection speeds problems. Thus real-time video streaming is almost impossible to deploy unless it runs at IP backbone.

SMART_EDU deploys DTH (direct to home) satellite multicast overcoming these end-users Internet speed obligations. It also benefits from efficient TV like quality video and audio MULTICAST from Lector to Learners over a satellite link.

This creates broadband infrastructure up to the end-user and assures highly effective use of communication resources thanks same capacity re-use for unlimited number of users. On top of it in provides return path via various mean suitable for various applications from chat, via phone to video return thus providing generally available tool for numerous application and market segments.

Partnership

Project is realised with a financial support of EU Commission Leonardo Da Vinci program

SMART_EDU consortium is presented by 6 organisations from 4 EU countries:

1. Main Data - Slovakia
2. COREP - Italy
3. ALBA - Greece
4. UIA - Belgium
5. LCDE STU Slovakia
6. TECNOPRAS – Italy

Background

In an era of transition to a knowledge based economies importance of Education becomes apparent. In a consequence governments including European ones are emphasising the importance of fundamental changes in education bearing in mind implementation of ICT into education.

European e-Learning initiative clearly states the needs of rapid moves towards full Internet connectivity at all EU schools by 2001 and implementing ICT technologies into education process by 2002 (there is 5 million teachers in EU countries).

The development of the global information society places new demands on the creation and delivery of learning materials and educational services. Education systems must learn to harness ICT to access a wider knowledge base and to help develop a new technology of learning. Yet in this still rapidly-changing sphere, the education world struggles to respond adequately to successive demands [2]

The report "Europe and the global information society" (May 1994), produced by the high-level group chaired by Mr Bangemann, stressed, "that throughout the world, information and telecommunications technologies are bringing about a new industrial revolution which already looks to be as important and radical as those which preceded it" increased use of subcontracting, the development of work in teams, are some of the consequences of information technology. Information technology is contributing to the

disappearance of routine and repetitive work which can be codified, programmed and automated. Work content will increasingly be made up of intelligent tasks requiring initiative and the ability to adapt.

"It is estimated that every year in the EU at least 20% of the economically active population is engaged in continuing vocational training/ education of various kinds for two weeks on average. According to a survey carried out in 1993 in 12 Member States, some 5% of male employees and 6% of female employees aged over 25 had undergone vocational training in the four weeks prior to the survey." [3]

There are detail tables proving high grow of ICT spending for ICT in Education in OECD countries. It is based on statistics gathered from OECD countries. Most of the ICT spending is represented by Internet Access and PC purchase [3].

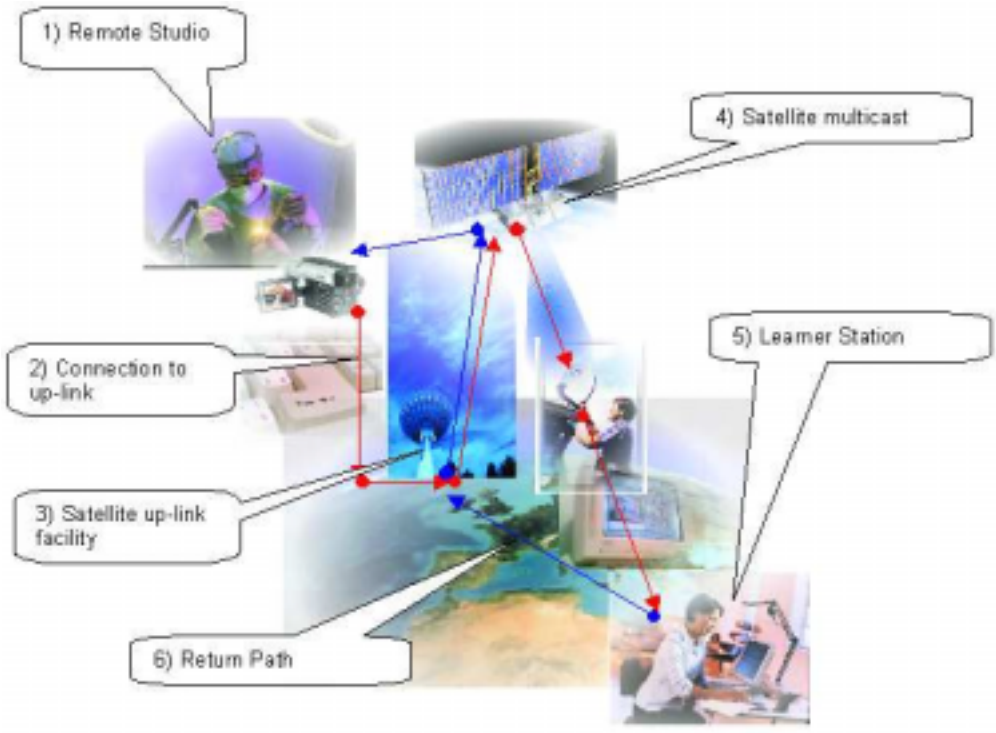
What are the technological aspects of Distance Education ?

The most promising technology today - Internet - is no capable to deliver most natural multimedia - the high quality STREAMING VIDEO (resolution, sampling rate, colour) to end-users due to the last mile speed obligations and missing QoS in IPV4. These are major drawbacks of its utilisation for Distance Education (as presented at ICDE conference in Vienna 1999 by numerous speakers).

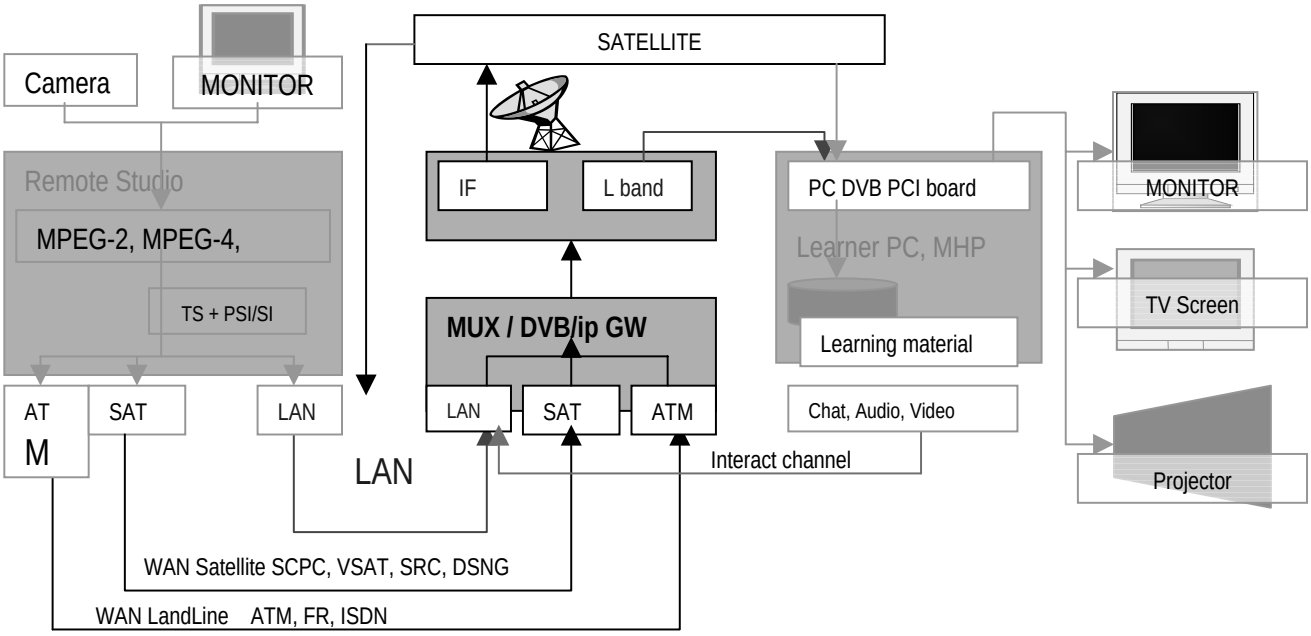
SMART_EDU project bypasses Internet bottlenecks by combining Internet with broadband Satellite Digital Television, thus allowing unlimited number of users to have access to high quality of STREAMING VIDEO and audio with Internet interactivity capabilities.

Main Components of the SMART_EDU platform are:

1. Remote Studio
2. Communication between Lector Studio and Up-link facility
3. Up-link facility DVB platform
4. Satellite Multicast
5. Learner station (PC based in future PC less)
6. Return channel



While establishing broadband Internet capable of delivering STREAMING VIDEO (640 kbps - 1,5 mbps) for each student is too expensive, digital Television is ideal affordable and viable last mile technology for large geographical area. While in a case of land line Internet each student has to have its own broadband line, in case of Satellite multicast all students are using the same broadband channel and narrowband return path (e.g. dial-up). While video via Internet occupies n x video capacity the same multicast communication via satellite requires the capacity for one student for unlimited number of students. It results in costs reduction for high quality video transmission.



What is SMART_EDU?

Very often it is for a number of reasons not possible to bring a trainer and a trainee together on the same physical location. Consequently the training process is being conducted by means of a video or an audio broadcast, the mailing of a course book, the creation of a website or another low-interactive way of communication.

Research has shown that the outcome of this kind of training sessions is poor. The main reason is that Learners are quickly demotivated when the human factor is missing. However self-disciplined the Learner might be the presence of a Lector or a coach is psychologically necessary for a successful learning process. Video-conferencing is the best way to make a Lector visual in ODL. Although the Lector is only virtually present Learners are much more motivated when they have the possibility to communicate with someone who might not be really present at the same location but of whom they at least know how he or she looks like on screen. However using video-conferencing for training purposes often is very frustrating. Because of the delay, which can have many causes, image and sound are not transferred synchronically. Often the trainee is confronted with a chaotic mixture of sound and images, which after a very short time results in the trainee giving it up to attend the training.

The main objective of SMART_EDU is to create a remote training environment that comes as close as possible to a real training session where the Lector and the Learner can interact with each other as in a real life situation, it means TV Like quality full screen video, without disturbing delay in time or without asynchrony of video and audio. To accomplish this SMART_EDU makes use of all possible modern communication technologies in a cost-effective way. SMART_EDU can best described as a high-interactive virtual training site that enables real time multi-point distance training.

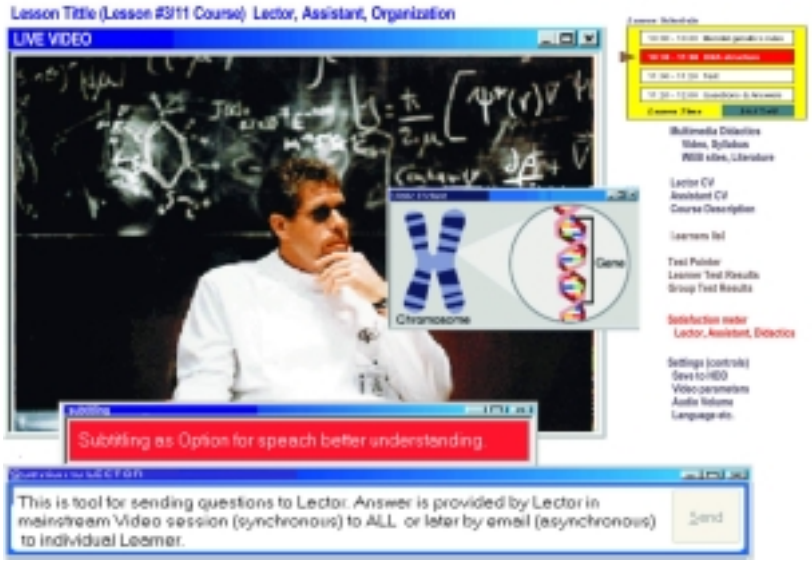
Target group

Smart_Edu is an ODL training environment that can be used for any training purpose in which the Lector and Learners cannot be present on the same physical location.

Content-wise the system has no limitations. It can be used for the training of any skill or subject, professional as well as academic. The system can also be used for meetings.

To use the system effectively groups of 20 or more Learners are assumed. The number of trainees that attend a SMART_EDU-operated training is unlimited. However one should be aware that the degree of interactivity between the trainer and the group of trainees decreases when the number of trainees increases as it is the case in a traditional real learning situation.

To facilitate the training of a larger number of persons it is advisable that the trainer can count on a pedagogical-technical assistant. The exact roles of the trainer, the pedagogical-technical assistant and the trainee are described below.



SMART_EDU Screen Components

The SMART_EDU training environment consists of a number of components, which can be activated and incorporated in a training session independently. Each tool has its pedagogical functionality.

Components list

1. Live video
    a. Basic Requirement: Low delay, good quality, Not OS dependent
    b. Video Format (compression) influences Learner site platform (PC or TV)
    MPEG-2 4:2:0 or non MPEG-2 (MPEG-4, H.263 etc.)
    Number of video channels, its Size, Resolution, mirroring of video window can vary according to application (e.g. Programming C++ versus Doctors surgery, mirroring for transparent board)
    c. Camera - even analogue VHS or Digital connected to Video Compression with S video output.

2. Live audio

    a. Basic Requirement: **High quality with Low Latency** + **Synchronization with Video required in all cases,** quality ranges from 38 kbps mono audio channel to 384 kbps professional quality stereo channel

    b. **Audio Format** (compression) influences Learner site platform (PC or TV)
    MPEG-1, layer II (AES) or non TV (MP3)
    Number of audio channels, its quality setting can vary according to application (e.g. multilingual translation)

    c. Microphone

3. Windows PC Screen Input (+ audio board ? input)

    a. Basic Requirement: There are different uses for PC Screen output:

        (1) Static picture (window snapshot) - e.g. diagram- One time transmission

        (2) Small picture changes (mouse cursos) - Low bandwidth

        (3) Middle picture changes (scrolling, animation) - Power Point Animations - wider bandwidth

        (4) Big Video Changes e.g. Video included in PC screen -
        Similar behaviour as Video channel Wide Bandwidth needs

    Likely each mode 01] 02] 03]) c) d) will require different compression alghoritm.

4. RS Chat Subsystem

Display just answered selected questions from Learner in Question message box.

5. Pre-recorder video or music from a video file (assistant)

Start video or audio file broadcast from a server.

6. Subtitling (future feature)

Will automatically subtitle native speach of lector into subtitle window to support understanding (problems with pronounciation)

Only when automatic Voice recogniztion system can be implemented.

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SVG PLAYER – INTERACTIVE PICTURES

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What is SVG ?

SVG - ***Scalable Vector Graphics*** is a new 2D-graphics markup language based on XML. The development of SVG started in October 1998; the last version of SVG definition was published on 4th September 2001 already as a W3C Recommendation. SVG is compatible with other web standards: HTML, XML Namespace, Xlink, Xpointer, CSS 2, DOM 1, Java, ECMA/Javascript, Unicode, SMIL 1.0, ... It allows us to include in HTML documents pictures described by their structure – composition of curves, shapes, text and bitmaps. Since the SVG viewer is not integrated yet into most web browsers we need, to view SVG pictures, to install it as a plug-in. An excellent SVG plug-in for Windows was produced by Adobe.

The SVG pictures are not static (as standard bitmaps GIF, TIFF, JPEG, PNG). The SVG viewer provides options to zoom in (to see details) and out (to see global view), to move the picture, to search for text, ... Besides this, using built-in animation capabilities or Javascript program support, the pictures can be made alive and interactive. To get some impression about SVG see the following examples:

Kaleidoscope: http://www.burningpixel.com/svg/Kaleid.htm,
Vienna - Social patterns and structures: http://www.karto.ethz.ch/~an/cartography/vienna/,
Europe: http://www.carto.net/papers/svg/eu/index.html,
Pilat Informatique Educative: http://perso.wanadoo.fr/pilat/
PC Technology in motion: http://www.usbyte.com/index_SVG.htm,
How to write hiragana characters: http://www.kenjikojima.com/HiraganaQuiz/.

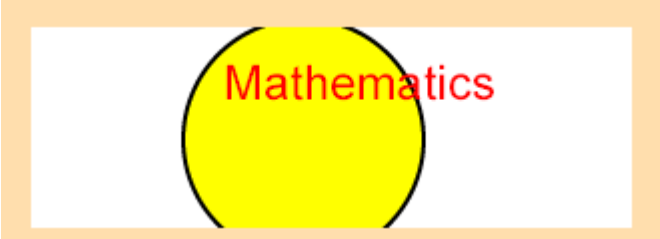
SVG pictures can be produced by drawing tools. In Windows we can use Adobe Illustrator, Corel Draw, WebDraw (by Jasc) and Mayura. But special programs for visualization of obtained data/results will produce most SVG pictures. The main SVG application areas are: data visualization, presentations (like Power Point), maps (GIS), technical layouts, and educational illustrations.

A simple example in SVG

Here is a simple example of picture description in SVG

```
<svg>
<circle cx="100" cy="50" r="40" stroke="black" stroke-width="2" fill="yellow" />
<text x="55" y="55" font-family="Verdana" font-size="35" fill="red" >Mathematics</text>
</svg>
```

It creates yellow circle with black border containing red inscription “Mathematics”.



To insert a SVG picture into a HTML document we use the <object> tag. For the picture from our simple example we have:

□□□
□□□
□□□

The attribute □□□ determines the location (URL) of the SVG file; □□□□ becomes important in advanced applications using Javascript or Java. The attributes □□□□□□ and □□□□□ are obligatory and determine the size of rectangle in which the picture is rendered. The value of □□□□ is the MIME-type of the file - for SVG file it can be □□□□□□□□□ or □□□□□□□□□□□□□. The attribute □□□□□□□□□□□ directs the user that has not a SVG viewer installed on his computer, to the web site from which he can obtain a viewer.

SVG player

Using the □□SVG tag we can partition a SVG picture to several parts. In the □□tag two attributes □□□□□□□ and □□□□□□□□□□ are available to control the visibility of the corresponding part. The difference between them is explained in SVG documentation. We shall use the □□□□□□□□attribute. Setting it to □□□□ we switch the visibility of the part off; setting it to □□□□□□ (or some other value) we switch the visibility of the part on. Using Javascript this can be done interactively allowing to the user to select the parts to be displayed.

To support the visibility controlled SVG pictures I prepared the ***SVG player*** - a collection of Javascript functions for controlling the value of □□□□□□□□attribute in parts of the SVG picture. The ***SVG player*** is given in the listing of the file □□□□□□□□□□□□. The Javascript functions and SVG picture are related by two arrays □□□□□□□ and □□□□□□□□□embedded as □□□□□ in SVG picture file. The array

□□□□□□□□contains a list of names of picture parts; the array □□□□□□□□□is the inverse of □□□□□□□ – for each name returns the corresponding index. For example:

```
<svg xml:space="preserve" width="300" height="50" viewbox="0 0 200 50">
<script><![CDATA[
   PicList[0] = "shape1";    PicIndex["shape1"] = 0;
   PicList[1] = "shape2";    PicIndex["shape2"] = 1;
   ...
]]></script>
   ...
  <g id="shape1" style="display:online">
   <rect x="5" y="5" width="40" height="40" style="&sty0;" /></g>
  <g id="shape2" style="display:none">
   <circle cx="75"  cy="25"  r="20" style="&sty1;"/></g>
  …
</svg>
```

The picture control HTML file combines ***SVG player*** (□□□□□□□□□□□□) and SVG picture and using HTML form tags provides the interactive control of the visibility of parts of the picture.

```
<EMBED WIDTH="600" HEIGHT="300" SRC="./picture.svg" NAME="PicA"
  PLUGINSPAGE="http://www.adobe.com/svg/viewer/install/">
<FORM NAME="control">
 <TABLE BORDER="0" CELLPADDING="0" CELLSPACING="2" WIDTH="100%">
 <TR><TD><INPUT type="button" value=" first " onClick="setAllPics('PicA','none');
   setPic('PicA',this.form,0,'inline');"></TD>
  <TD><INPUT type="button" value=" last  "
     onClick="setAllPics('PicA','none'); setPic('PicA',this.form,5,'inline');"></TD></TR>
 <TR><TD><INPUT type="button" value=" next  " onClick="nextPic('PicA',this.form);"></TD>
  <TD><INPUT type="button" value=" prev  " onClick="prevPic('PicA',this.form);"></TD></TR>
 <TR><TD><INPUT type="button" value=" showA " onClick="setAllPics('PicA','inline');"></TD>
...
</FORM>
```

File:

}

Because of the limited space available for this paper we can not give here a detailed explanation of the ***SVG player*** logics. The hints given here should be sufficient to understand the examples available on the internet. A ZIP file with the last version of ***SVG player*** and related example files is available at http://vlado.fmf.uni-lj.si/pub/SVG/SVGplayer/ . A test application of SVG player displaying all its capabilities can be found at http://sio.edus.si/list/1/svg/svg03.htm .

Some applications of *SVG player*

One of the simplest applications of ***SVG player*** is to combine several bitmap pictures into a single SVG picture as its parts. Then, using the ***SVG player***, we can display selected pictures in the same place on the page. An example of this you can see at http://vlado.fmf.uni-lj.si/pub/CONF/DSI.01/kuk.htm .

At http://sio.edus.si/list/1/svg/svg04.htm you will find the page with SVG visualization, using the ***SVGplayer***, of the step by step construction of the perpendicular (from a point to a line).

Based on the ideas used in ***Logo2PS*** and ***SVG player*** I prepared for ***MSWLogo*** a collection of logo commands ***Logo2SVG*** that allows user to save a trace of the Logo turtle as a (visibility controlled) SVG picture http://vlado.fmf.uni-lj.si/educa/logo/logo2svg/ .

The option to produce (visibility controlled) SVG visualizations we implemented also in our program ***Pajek*** (http://vlado.fmf.uni-lj.si/pub/networks/pajek/) for analysis and visualization of large networks. Some examples are available at: http://vlado.fmf.uni-lj.si/pub/networks/pajek/examples/ .

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ASYNCHRONOUS DISCUSSIONS IN VIRTUAL SEMINARS: MIGHT THEY WORK?

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The debating club format of the presentation

The presentation borrows from the traditional British 'debating club'. The motion is that "asynchronous seminar discussions can be as good or better than traditional classroom seminars". The motion is proposed by Ulrich Bernath and opposed by Thomas Hülsmann, both from the Center for Distance for Distance Education at Carl von Ossietzky University of Oldenburg/Germany.

We will take a vote from the plenary in the beginning and see if the debate have shifted convictions by also taking a vote at the end.

The proposer's view

Ulrich Bernath sets the scene by describing how he experienced the asynchronous communication process in virtual seminars for professional development as well as in a graduate program. After having described the background Ulrich Bernath will stress advantages of asynchronous communication processes. His arguments emphasize that asynchronous communication facilitates reflection; this is due both to the stability of the text-based format and the structured character of the communication process (through readings and instructional inputs) and its the asynchronous character. He will refer to the 'ripple effect' (Bernath & Rubin 1999a). The possibility of expressing oneself actively in writing is a potent mode of learning. Expressing oneself anytime without competing for time gives asynchronous communication another definite advantage. Furthermore, asynchronous communication allows also to support collaborative learning in a virtual seminar. Examples and experiences can be drawn from teaching the Foundations of Distance Education course in the Master of Distance Education program, jointly offered by the University of Maryland University College (UMUC) and Oldenburg University and its for-runner, the Virtual Seminar for Professional Development in Distance Education (Bernath & Rubin 1999b, Bernath & Rubin 2001).

The opposer's view

Thomas Hülsmann, who has taught the same course also, will highlight the deficits of asynchronous discussions. Again his analysis is based on analysis of the structure of the asynchronous communication space. The analysis accepts that in asynchronous communication has one definitive advantage rooted in the very structure of asynchronous communication. 'All can speak at the same time'. Also the opposing view accepts that articulating oneself is an important mode of learning to which access is not limited as it is in a traditional seminar (characterized by turn taking). But what price to pay? The more this advantage is made use of and communication level high. All speaking at the same time almost inevitably creates a cacophony of voices which borrowing a metaphor from information theory could be referred to as 'white noise'.

Though threading provides a structuring tool to impose some structure, the asynchronous and text based character produce inevitably the following effect: the attention of participants is skewed strongly towards the message just opened. This message is of high visibility. Arguments leading to this last message are likely to be shrouded in oblivion. The effect is an 'argumentation process without history', much like a 'Markov chain', a process without memory. This has a peculiar effect: the longer the thread, the more comments are likely to 'veer off' topic. This might have led course designers to discourage deeper thread levels (as it is the case in WebTycho where threading is only supported to level three) since the longer the thread the more unlikely it is that the message is 'on target', at least with respect to the original main topic set by the teacher.

While the opposing concedes that the format well supports reflective argumentation, it may however overdo it in two directions: first, the intermittent access times of the various participants almost inevitably erodes focus and lets motivation cool out. This produces inefficiencies: each time you access the class, especially in case of classes with high communication volume, two digit numbers of messages may wait for the participant. These messages may be distributed over diverse main topics. Having left the discussion some days ago, it is hard to reconfigure what has been the matter. Such a situation is unlikely to lead to the reflective process the 'ripple effect' wants to make us believe. (it rather corresponds to a situation where ten stones are thrown into the water at the same time, leading to quite chaotic rippling patterns). In fact, observed student behavior does not support the 'ripple hypothesis'. More often than not posting patterns of students suggest that they have specific times of access and 'batch processing' the new messages.

The reflective character of online discussion is also due to its text based character. The stability of the text is indeed facilitating analysis and reflection. But the 'darkness' of the online classroom in which participants are visible to each other only through their texts impinges on the process of argumentation. Sharp arguments are predicated on trust since they might involve a measure of conflict. Such a relation of trust is based on the distinction between argument and person. However, in text-based communication author and text merge. Being visible through the text only means that the traditional distinction between 'argumentum ad rem' and an 'argumentum ad personam' is not longer sustainable. Empirically, the anxiety to take on another person's argument is reflected in the extreme politeness of most online seminar communication and an observable reluctance to express disagreement. Hülsmann will contribute a number of observations from various teaching online courses in the same program (MDE offered by UMUC and Oldenburg University) to substantiate his points.

Wrapping up the debate

The choreography of the debate could include both participants mustering some or two supporting voices from the audience before asking for the vote.

In a final round both participants will make suggestions how to improve online discussions and to make it a better format for academic discourse. Both partners agree that improved threading would be one of the features contributing to achieving this aim.

More information on the MDE program which serves both proposer and opposer of the motion as their experiential base can be found at

http://zefnotes.uni-oldenburg.de/ASF/ASF.nsf

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(RE)SEARCHING FOR LEARNERS: THE LESSONS OF A RURAL COLLABORATIVE PROJECT INVOLVING ICT

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Introduction

The British Government of Tony Blair has recently affirmed the desire to have 50% of all 18-30 year olds in higher education by 2010 (Woodward, 2001). Woodward (2001) goes on to suggest that, in order to reach the targets, higher education has to improve on the 25% of entrants who come from the 50% of the population in skilled manual, semi-skilled or unskilled families - social classes IIIM, IV and V. But therein lies the rub, for the vast majority of people in those social class categories do not have the entry qualifications appropriate to enter higher education. This is particularly so in rural areas (Foley And Martin, 2000, Fothergill, 2001). The situation is common to other countries such as Australia (James, Wyn, Baldwin, Hepworth, Mcinnis And Stephanou, 1999) This means, consequently, that widening opportunities projects have to innovate in ways that current providers do not in order to attract students. It is my role to research and evaluate such innovations, and the role and potential of projects to penetrate the rural areas that hitherto have proved difficult to penetrate.

The juxtaposition of the words 'searching' and 'researching' in the title, consequently, is intended to relate to some of the major issues surrounding the development and implementation of a major cross-Further and Higher Education institutional initiative in three rural counties of the West Midlands of England. The three rural counties are very much on the edge of the English West Midland conurbation, and suffers from that, for the major planning processes such as transport tend be based upon the large Birmingham conurbation that contains by far the greatest proportion of population and resources. Though there are 10 universities in the West Midlands region, and two institutions with university college status, there are only two of these institutions with physical campuses in the three counties concerned. Some of the universities do run some courses in colleges of Further Education in the three counties, but the provision is not extensive. Whilst this lack of campus provision in the three counties is perceived partly as a matter of supply and demand, the region is still a net exporter of students to higher education generally. That is, the majority of students who enter higher education from the three counties do so by moving out of the area. This has given rise to concerns over the loss of highly qualified person-power, for many of the learners do not subsequently return to the area.

In a previous job, one of the authors was in charge of a development project designed to assist a college in the Solomon Islands in the South Pacific to develop their capacity to deliver to distance education to a total population of circa 300,000 on 300 different islands speaking 94 different languages. This project was not entirely successful in its objectives for a number of reasons. A major factor was cultural difference that was based upon different social and economic imperatives. A second reason was the necessity to dovetail with the local political issues and development priorities (Foley and Martin, 2001). Research evidence from the Rural Opportunities project suggests strongly that both of these issues appear to continue to be key factors in the current counties and higher education institutions! In effect, the project officers, one in each of the three counties, have sought to stimulate interest and demand in a number of ways.

These strategies in the Rural Opportunities Project can be classified under five headings, these being:

1. Supporting the provision of New Opportunities (e.g. developing campus-based modules for delivery in ICT mediated distance learning format);
2. Providing Information about Existing Opportunities (e.g. websites, targeted advertising, mail-shots and call centres);
3. Assisting access to Opportunities/Information (e.g. transport costs to centres, careers conventions etc.)

4. Providing Practical Support (e.g. study centres for students); and
5. Providing assistance to help overcome obstacles (e.g. assisting institutions to recognise the variety of routes into HE).

Each of the three county project workers have supported or have carried out county-specific and sensitive versions of these five categories of initiative, and are involved in forms of practitioner research to evaluate them. The findings to date will be presented and compared, and a meta-analysis presented of the issues surrounding project formats for developments will be considered, especially in relation to what might be termed 'issues of 'rural peripherality' and inter-agency conflict (Morgan, 2001). In particular, the issues of social capital (Dreissen, 2001, Bedard, 2001, Colley and Hodkinson, 2001) of potential Higher Education students is considered, and linked to previous work I presented at the first EDEN Research conference, that of the Learning Support Needs of Distance Education Students

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HERO – HEALTH PROMOTION AND EDUCATIONAL SUPPORT FOR THE REHABILITATION OF OFFENDERS

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Introduction

The HERO-project is funded by the European Commission in the framework of the Information Society Technologies (IST) programme, situated within the Learning Citizen Cluster. The main objective of HERO is to develop, demonstrate and evaluate IST applications and services to promote the rehabilitation of offenders and to evaluate the impact of these services on the inmates.

Two main types of offenders are targeted: 'first offenders' between 18 and 25 years old (typically awaiting sentence or 'on remand'), and prisoners due for release. For these two target groups, HERO aims to provide two sets of services: health promotion services, and learning services. These services aim to prepare the ground for the rehabilitation of offenders by creating a 'learning environment' within which

a. first offenders can be empowered to more productively manage their health and educational needs 'on the inside' and
b. prisoners due for release can make more strategic preparations for life 'on the outside'.

A key objective of the project is to help to provide input towards the promotion of a common rehabilitation framework and standardisation of rehabilitation practices within the member states of the European Union.

Prisons are a challenging setting for IST, for reasons such as access, data protection, social isolation and poor motivation. HERO will, therefore, develop and deliver an integrated package of personal health systems, focusing on depression, drugs harm minimisation and risk reduction behaviour support for HIV/STD. It will develop in parallel customised learning programmes for offenders, using scaffolded pedagogic models and multi-media authoring applications.

The backbone of the services will be the Interactive Content Repository (ICR) - an evolving knowledge base of core information resources - which will provide a 'knowledge bank' for health promotion modules and training courses. The ICR will be supported by data management and data mining tools to ensure the services are tailored to user needs, and to ensure integrity and data security. The services will be delivered through the internet and hybrid platforms (e.g. closed LANs with gateways to the internet).

Education and Training in Prisons – State of the Art in Germany

A remarkably high number of prison inmates come from low-income, urban communities, which are also the most likely to be under-served in terms of educational support programs. Not surprisingly, a disproportionate number of the incarcerated are undereducated.

The legal basis for education and training in German prisons is laid in the Prison Act ('Strafvollzugsgesetz [StVollzG]') of 1977. Paragraph 2 is specifying, that "educational services should be provided within the working hours of the prisoner". Concerning education in the free time of the prisoner, § 67 of the Prison Act is stating, that "in the free time, prisoners should be given the possibility to participate in education including sports, distance education, courses and other further qualification offers […] and to use a library".

In practice, the majority of German prisons provide training in work related skills for prisoners. The 'German Penal Code' ("Strafgesetzbuch") includes the obligation to work or to participate in a vocational training. Training activities are chosen to give as much employment as possible and also to give opportunities for those in prison to acquire skills which will help them secure employment on release.

The courses available in each penal establishment are varying, but are mainly centred on trade and crafts (e.g. bakers, mechanics, carpenters, cooks etc.) and to a less extent on commercial occupations (e.g. secretaries, sales persons etc.).

Along with work-based training, educational services are regarded to be one of the most effective instruments within the penal system in order to enable prisoners "to lead a life in social responsibility without crimes" and subsequently "…to protect the public against further crimes" (§ 2 of the German Prison Act).

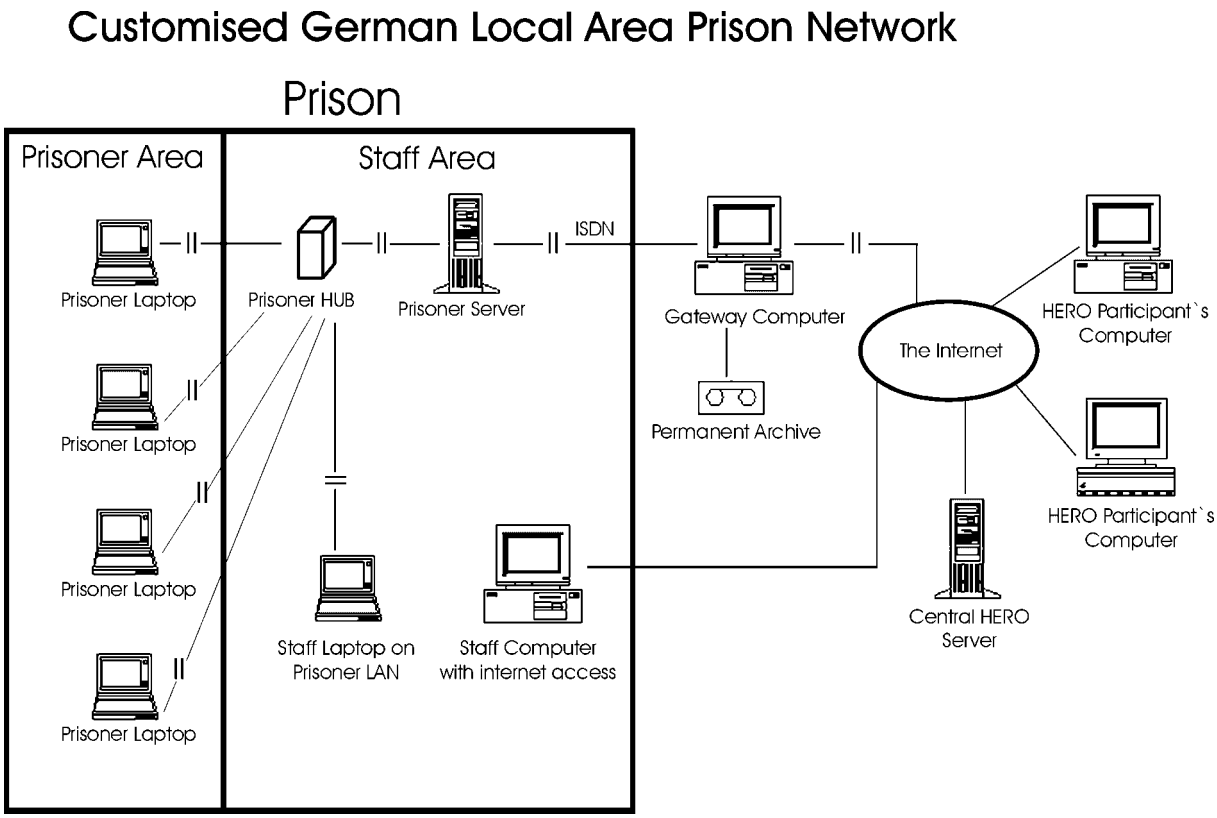
The Prison Educational Services ('Pädagogische Dienste') in federal penal establishments hence offers a broad programme of education and training possibilities ranging from basic literacy courses to the 'Open University of Germany' (i.e. 'Fernuniversität Hagen'). The curriculum includes physical education, health education, social education, creative activities (art, drama, music and writing) as well as the more conventional school subjects leading to secondary education as well as to vocational certificates, graduations and qualifications.

In practice, however, various obstacles prevent an inmate from completing a vocational training or a graduation:

- the federal state-based organisation of the German penal system means that each state is responsible and in charge of its federal prison system (and therefore also provides the running costs for its inmates). Prisoners who want to receive education and training in another federal state have to pass long-lasting bureaucratic procedures
- not all the federal states do provide a wide range of vocational training
- not all institutions do offer all levels of graduation
- courses offered in the leisure time often compete with opening hours for gyms, courtyard, etc.
- prisoners´ aversion against "traditional" classroom situation.

The HERO approach - Technology

FIM and the prison site in Erlangen have designed a computer system under the permission of the Bavarian Ministry of Justice. It consists of 8 notebooks in prisoners rooms (singular cells) connected to a dedicated "prisoner server" by a closed LAN. Prisoners thus will have access to the HERO system between 8:30 a.m. and 10 p.m. Due to the in-built security mechanisms (e.g. restricted user profiles), these computers will have Windows 2000 (equipped with standard software e.g. Office 2000). Three dedicated staff notebooks will also be connected to this LAN (i.e. 2 notebooks for therapists and social workers; 1 notebook for the system administrator of the site), for the purpose of monitoring, answering e-mails, etc. Furthermore one reference notebooks will be situated at FIM-Psychologie. The LAN and the connections to the prisoner notebooks will be interrupted by closing down the power supply of the prisoner HUB every night between e.g. 10 p.m. and 8:30 a.m. During this period material will be transferred to this network from outside the prison (e.g. to the gateway computer, to the main HERO server etc.). At the same time any prisoner feedback will be transferred back to the gateway computer and if necessary to HERO, and prisoner e-mails will be forwarded at this time. It is also foreseen to have Virtual Network Computing (VNC) available to monitor online the prisoners working with the system.



A gateway computer, sitting between the prisoner server and the Internet, will be installed to facilitate archiving. According to a request of the prison site, the gateway computer will be located at FIM-Psychologie and will be connected via an ISDN line to the prisoner server. To guarantee maximum security both machines will be connected via a temporary ISDN line with phone number authentification. Therefore only the gateway computer can call the prisoner server with only one specified number. On the other hand the prisoner server line is blocked to call any outside number. In case a prisoner would be able to access the prisoner server illegally, he would then have no chance to access the outside world.

The monitoring and censorship of outgoing prisoner mails will be done on the 'Prisoner-Server', the mails will be sent after approval by the prison staff. Monitoring can take place either on the 'Prisoner-Server' and if necessary on the gateway computer at FIM. Incoming HERO material and both incoming e-mails (via qmail) will be monitored and approved on the 'Prisoner-Server'. They will be ready for delivery one day after receiving them on the 'Prisoner-Server'.

The HERO approach - Pedagogy

On the current labour market a high percentage of work places depends on ICT skills. Despite of some exceptions, penal institutions up to now offer only some restricted possibilities for inmates to attend ICT-based further training or e-training/e-qualification.

HERO aims at providing inmates with the possibilities to learn on a self-managed basis. Information available on the computer will consist of :

- a computer course (including WINDOWS, MS Word, Access), "COMT"
- social skills resources, "TOP"
- information about drugs, alcohol, diseases, etc.
- selected and useful pages from the WWW
- excerpts from newspapers and journals.

The inmates have their "own" computer (laptop) in the cell and can learn whenever they like. Apart from the laptop and the CBTs for computer programs, they obtain print-material with step-by-step explanations. If an inmate has some problems with the material, he can rely on a support network by contacting a tutor at FIM or another inmate (a peer learner) participating in the course via email

(which will be delivered one day later). Meetings between all the participating inmates and the tutors will be held physically on a regular basis to guarantee a direct feedback.

Apart from learning material, each learning session of the inmate will begin with a short questionnaire concerning personal well-being and motivation. Every four weeks, a questionnaire will capture the personal development and learning success of each inmate.

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SELIM: HUMAN COMPUTER INTERACTION IN THE CONTEXT OF MULTIMEDIA LEARNING SYSTEMS AND THE ASPECT OF ADAPTIVITY ON THE BASIS OF CULTURAL DIFFERENCES

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Introduction

In developing multimedia learning systems questions concerning the didactic basis of these applications are frequently discussed, whereas in the most cases aspects of human-computer interaction (HCI) design are neglected. HCI research tries to improve the usability of user interfaces by taking into account the needs of the user and the demands made by the task he or she has to accomplish. Especially during the long-term process of learning users should be able to concentrate on their task instead of wasting their attention on solving problems resulting from the interaction with the system. The first goal of the SELIM project is to identify connections between learning theory and HCI design applied in the field of multimedia learning systems and to develop a generalized model for the construction of such user interfaces. The second part of the study is designed to investigate cultural differences in academic styles and learning behaviour which have an impact on the conceptual structure of learning software, i.e. on the appearance, functionality, presentation of content and the didactic approach of the educational environment. We intend to extend our research by adding the implementation of a user modeling component which allows learning systems to adapt to the needs of users from different cultural backgrounds.

Learning theories

Many multimedia learning systems are based on the principles of a learning theory. There is a wide range of opinions about how learning occurs and how it can be facilitated. And even within theories viewpoints may vary considerably. Behaviorism favours the view of learning as an observable change in behaviour. The learner is considered as adapting to his environment while being exposed to certain stimuli. Behaviour is reinforced by providing immediate and positive feedback (Schulmeister 1998, 93). On the basis of behaviorism the method of 'programmed instruction' was developed. It is characterized by segmenting the subject-matter, checking the progress of the learner after each step and giving adequate feedback. Cognitivism stresses the internal processes which occur during learning. Learning is considered as information processing including information input, processing and storage. Successful learning depends on the way in which information is presented and on the cognitive activities of the learner (Kerres 1998, 57). According to the cognitivist view, it occurs by constructing mental models or schemata and by integrating them into existing knowledge. The main goal is to impart to the learner knowledge about problem solving which allows different methods to form a correct answer. During the problem solving process the learner may be supported by an intelligent tutorial system (ITS). While behaviorism and cognitivism emphasize the importance of teaching, the constructivist view concentrates on the learner's perspective. Constructivism assumes that learning is an individual, internal process which occurs on the basis of the learner's experience or his/her social context. Every person constructs knowledge actively and individually according to his/her prior knowledge, therefore many ways of construction exist and learning processes are hardly predictable. Consequently, learning is mainly influenced by the context of the learning process rather than by the presentation of information. Obviously, the user interface of a learning system varies enormously depending on the learning theory which has been chosen. While in behaviorist systems user-computer interaction is strictly determined by the system, constructivist design concedes to the user freedom to decide what to do depending on his personal experience.

Each theory stresses different aspects of learning, and each theory has its advantages and disadvantages. Behaviorism supports the presentation and memorization of basic knowledge or skills (Baumgartner & Payr 1997), but learning systems constructed on the basis of the behavioristic theory are frequently

considered as boring by learners who had used them for some time. The cognitivist theory is mainly suitable for problem solving, but it is difficult to gain knowledge about internal processes which occur during learning in 'real' situations (Kerres 1998, 57). This knowledge is required if information is to be presented in a way that will help learners to set up the correct mental model. The constructivist view focuses on learning how to deal with complex situations, since knowledge is to be detached from a given context. On the other hand, systems built according to constructivist principles often become very complex and difficult to handle, for the learner gets responsible for the organization of the learning process (Blumenstengel 1998). Since each of the theories shows deficits, their positive features could be combined (cf. Reinmann-Rothmeier & Mandl 2001 who propose the integration of an (optional) guidance into constructivist learning environments).

Adaptivity of educational hypermedia

Adaptive educational hypermedia systems combine the concept of hypermedia systems and intelligent tutoring systems enabling personalized access to information. They adapt the content, structure, the presentation of the hypermedia objects, and the navigation support to the individual needs of the learner. There are two different basic types of adaptation depending on the amount of control a user has over the system. Adaptability enables the user to control the performance of the system, for example by selecting functions or content, or by adapting the design of the user-interface to their personal preferences. Adaptive systems perform these steps autonomously (cf. Kobsa et al. 2000). The adaptation component of the system guides the student through the learning space. It personalizes the learning session by using an individual user model to collect information about his knowledge, his expectations, goals, and preferences concerning the content presentation, the navigational structure and the didactic concept of the system. (cf. Kobsa/ Wahlster 1989). Our research is intended to show which of the many components of an educational hypermedia system should offer adaptability and which should remain under the control of the system.

Cultural differences in academic style and learning behaviour

1. Johan Galtung's analysis of cross-cultural differences in intellectual styles

Galtung (1981) has argued for culture-bound variables in intellectual styles of different countries. By intellectual style he understands basic culture-bound models of thought and behaviour shown principally by intellectuals. On the basis of his experience in working with scholars from different cultural backgrounds, he contrasts four intellectual styles. He distinguishes between "saxonic", "teutonic", "gallic" and "nipponic" academic style. Despite the clear allusions of the chosen designation, Galtung stresses that these styles are not to be identified directly with patterns of behaviour and thought in specific countries; e.g. the teutonic style is at home not only in Germany but also in the whole of Eastern Europe. The main aspects of Galtung's analysis concern paradigm analysis, descriptions, theory formation, commentary on other intellectuals. The saxonic style for example is very strong on the production of hypotheses and weak on theory formation and paradigm analysis. The teutonic and the gallic styles are very strong on theory formation and paradigm analysis, but weak on theses, with the gallic style stressing the significance of the elegance of expression. The nipponic style stands out for a nonlinear, circular thought pattern and argumentation structure. The aim of our work is to examine whether Galtung's position can be defended in the field of educational software.

2. Michael Clyne's contrastive analysis of written discourse

Different conventions in composing written discourse do exist in different cultures and these conventions need to be observed when composing teaching materials and developing learning software for an international audience. Clyne (1991) compared English and German essay writing and found several areas of cultural differences in structures of the written discourse:

- Linearity vs. Digressiveness
- Form orientation vs. content orientation
- Textual symmetry
- Abstractness vs. concreteness of the content
- Content structure
- Continuity in argumentation
- Data integration
- Use of advance organizers
- Writer responsibility vs. reader responsibility

3. Hofstede's dimensions of culture

In his survey among over 116,000 employees in a large multinational corporation in forty countries Hofstede (1997) investigated four dimensions of cultural differences:

1. *Power distance* refers to the extend to which subordinates (employees, students) respond to power and authority (managers, teachers) and how they expect and accept unequal power distribution.
2. *Individualism vs. Collectivism*: these polar values measure the ties among individuals in a society.
3. *Uncertainty avoidance* focuses on the extent to which people feel threatened by uncertain or unknown situations.
4. *Masculinity vs. Femininity*: these two polar values describe the differences between the social roles attributed to men and women and the socially expected behaviour of the two sexes.

The differences related to the cultural dimensions influence the structure of learning situations, the learning process, the content and presentation mode of teaching materials, the instructional practices and the relation and communication between teacher and student and among students as well (cf. Hofstede 1986). Hofstede's research on cultural values, and especially his cultural parameters of uncertainty avoidance and power distance also faciliate the understanding of the variation in discourse structures.

SELIM's Approach

Obviously, each of the learning theories is suitable for specific learning objectives and for certain groups of learners. The learning objective, the characteristics of the learner and the kind of knowledge to be taught form the basis for choosing the adequate learning theory. In order to achieve a user and task centred approach these elements should influence the design of the user interface. If the set of user attributes varies (e.g. by improving their knowledge) the didactic concept has to change and therefore the requirements on the user interface will change. The goal of the SELIM project is to develop a user interface design model for the construction of learning systems which matches the needs of users with different characteristics without changing the appearance of the system in a fundamental way. The second goal is the exploration and identification of the cultural variations and preferences of academic writing and learning styles which might have a significant impact on the design of educational environments.

In the first step, we developed two protoypes based on different learning theories in order to find out which aspects were favoured by the users. Since the users' needs and users' tasks play a central role in HCI (and in information science as well), the user group and their task had to be determined. As content we chose exercises on 'Evaluation of Information Retrieval Systems' which is part of the introductory lecture 'Introduction to Information Science', therefore the users are students of the first term. Protoype *bekog* combines behaviorist and cognitivist elements. Its structure is linear and textual pages are followed by questions and exercises. As the possibilities for navigation are quite restricted, the system mainly leeds the user. Feedback on the questions is immediate and explicit. The user is supported in solving his problem by a small 'tutorial' element, which gives hints on request. In addition, we provided pages based on research results in the field of cognitive psychology which are supposed to support the construction of mental models (Rüppel & Pfleging 2000). First the subject is embedded into a bigger context, then the user is asked to combine the known terms and their explanations in order to recall those he has already learned. Finally there is an animated diagramm which demonstrates the relations between the most relevant terms. Prototype *kogkons* integrates cognitivist and constructivist elements. It consists of two parts, one that provides texts and explanations and the other that contains questions and exercises. Each part can be worked on separately, but the user can also jump from one part to the other (e.g. read a text and jump to the corresponding exercise). Thus the user is quite free in navigating through the system. In addition the system offers an 'ideal' path, which guides the user. This way the user has diverse navigation possibilities. The starting point for his/her work is a complex problem to be solved (comparing the search results of two internet search engines) which runs through the whole lesson. If the user follows the ideal path, he usually answers questions first and is led to the text which gives feedback afterwards,

thus feedback often is implicit. In addition to that, exercises are more diverse, e.g. the user investigates the search results and formulates his findings.

These two prototypes had to be compared in order to detect problems in interaction (e.g. navigation, answering questions), and to find out in which situations users manage well, which solution they prefer, and where support has to be increased. We carried out a usability test with two groups of students of the first term participating. One group worked with the system *kogkons* the other with the system *bekog*. The user interaction was documented on video, the users were requested to 'think aloud'. In order to stimulate the 'thinking aloud' technique and to create a social context in the learning situation, the users worked in groups of two. The tests have just been completed, now the video protocols are to be analysed. The results will be used to improve the two systems. In a next step, the design principles which have been worked out will be transferred to a different application context, i.e. a different lesson for students of the first term. Finally, the two system architectures will be integrated into a model which combines different elements of both.

The interest behind the cross-cultural research is the question of whether different cultural backgrounds lead to differences in the design, navigational structure, content presentation and the didactic approach of a learning program.The second part of this study is based on two research methods. The evaluation of educational programs on CD-ROM and tutorials on the internet employs a catalogue of over fifty criteria which can be classified into the following categories:

- *General information* (e.g. culture/ language of the author, topic, source of the program)
- *Design* (e.g. typography, the use of colors, images, icons, symbols, metaphors, types of media)
- *Interaction and navigation* (e.g. implementation of menus, use of conventional navigation tools such as list of content or glossary, use of specific hypermedia navigation tools such as paths, hyperspace maps, history, link annotation)
- *Content* (e.g. information structure, types of content such as abstract concepts, facts, examples, statistics, combination and sequence of these chunks of information, the use of language)
- *Didactics* (e.g. general didactical approach, learning objectives, feedback presentation, means of motivation, different types of exercises)

The second method applied is a questionnaire drafted by following the idea of the Learning Style Inventory (LSI) proposed in Kolb (1984). This self-description test is based on the experiential learning model which represents the learning process as a four-stage cycle composed of four learning abilities: concrete experience, reflective observation, active experimentation and abstract conceptualization. The LSI measures the relative emphasis on the four learning modes along the two dimensions allowing the identification of four types of learning styles: Converger (Pragmatist), Diverger (Reflector), Accomodator (Activist) and Assimilator (Theorist). The second section of the questionnaire involves questions on computer experience, attitudes towards computers, system use behavior, and preferences concerning the design and functionality of educational software. We believe that cultural values also influence learning styles and preferences. The culturally specific educational environment in which students learn to acquire knowledge has strong effect on their personal learning style affecting the acceptance and effectiveness of educational software as well. Our aim is to find out which of the characteristics of the four learning styles can be attributed to the culturally biased learning behaviour of the subjects from different cultures.

After analysing the learning preferences expressed by the subjects and completing the evaluation of the educational programs we plan to set up profiles shared by users from different cultures. These profiles are supposed to form a basis for the concept and realization of the user modeling component of an adaptive learning system addressing students from different cultures. The validity of these profiles will need verification through the evolutionary approach of the rapid prototyping process described above involving cross-cultural usability testing with students from multiple cultures.

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CONTENT ANALYSIS OF CMC DISCUSSIONS: A SURVEY OF RESEARCH

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Introduction

CMC (Computer Mediated Communication) technologies facilitate group discussions and collaborative activities, enabling learning to occur within a social context. Kanuka et al (1998) note that this accords with social constructivist theory: robust understanding and knowledge are socially constructed by negotiation of meaning through collaborative talk and interaction (see McCormick and Paechter, 1999).

This survey focuses on research into CMC discussions by *asynchronous* text messaging. Henri and Rigault (1996) contend that these provide more intense communication than face-to-face, because participants are freed from the struggle for *the right of audience*. Bullen (1998) makes a similar point, that CMC has a democratising effect because it prevents domination by verbose face-to-face speakers, also that asynchronicity provides time for composing thoughtful rather than spontaneous responses.

That is the promise, but to what extent can it be fulfilled? Effective use of CMC has become a major research focus. A powerful tool in this research is enabled by the technology's provision of the online transcripts. These can be analysed by researchers to discover contingencies for robust learning.

Five particular studies will be discussed. Weaknesses are to be expected in research that is breaking new ground. For each of the five studies, some apparent weaknesses will be suggested. These are offered as ten questions for discussion and future research.

Research study A

Stacey (1996) conducted a full year's ethnographic study. She investigated a CMC conference in a post-graduate MBA program (participants N = 31).

She used the NUD*IST software to help her categorisation of the messages. The software is reportedly a miracle compared to cutting and pasting. Basically, one starts to read the transcript and categories come to mind. As these begin to be confirmed, you can re-read the text and highlight sections that relate to the category. Then you can look at all the text related to any category and decide whether to sub-categorise or re-categorise. The software allows you to gather text from similar categories, to look for overlaps and links between categories, tally the category frequencies, and so on.

Stacey sorted the online conference messages into the following categories and subcategories, which she claimed were grounded in the transcripts themselves, rather than in her own epistemological perspective. (She had made no secret of her strong faith in CMC-facilitated student-student collaborative learning).

1. Attributes of social construction of knowledge
    a. Clarifying of ideas via group communication
    b. Obtaining feedback to a learner's ideas from other group members
    c. Sharing the diverse perspectives of the group members
    d. Group sharing of resources, new ideas, and expert advice
    e. Seeking group solutions for problems
2. The power of group discussion mediated by communications media
    a. Practicing the new language of the knowledge community in small groups
    b. Learning in a safe setting for risk (the small group setting)

3. Attributes of a supportive environment for collaborative behavior
    a. Providing socioaffective collaborative support
    b. Providing technical support collaboratively
    c. Planning to continue the group beyond the course
    d. Using group responsibility as an individual motivator
    e. Changing roles with changing needs (in small group activities)
    f. Using the conferences to manage group activities

The report omitted to provide any evidence of learning. There was not a single message segment quoted to illustrate that learning had indeed occurred. In fact, under categories 1 and 2, which directly concerned learning, there was only one quoted message segment between all seven subcategories. (The student admitted a deficient understanding of "elasticity" and implicitly asked for feedback).

Another omission may have been to underestimate the effect of the tutors (Stacey herself was one). She admitted that "the electronic medium provided a quick and constant means of seeking feedback (from the tutors), which the groups took advantage of". It is therefore curious that Stacey's analysis excluded the category "seeking and receiving just-in-time help from a teacher". Hence she fails to entertain the possibility that the tutor's feedback may have been a pivotal agent of the learning. Tagg and Dickinson (1995), found that student activity is encouraged by "a pattern of frequent, prompt tutor responses that address individuals and offer guidance in a succinct and predictable manner".

Research Study B

Bullen (1998) conducted a case study of an undergraduate course that was delivered by text-based computer conferencing. The Computing students (N = 16) and the instructor discussed questions on *ethical issues* pertaining to the course readings. Bullen cites many scholars who extol the potential of computer conferencing to facilitate critical thinking and knowledge-production through dialogue between students and with the instructor. Critical thinking was his main concern.

He marked up students' messages for instances of four critical thinking skills (communicated to the students from the beginning): *clarification*, *assessing evidence*, *making and judging inferences, appropriate strategies*. Instances of uncritical thinking were also noted. Students were categorised according to the ratio of instances of critical to uncritical thinking: high ratio (3), medium (2), low (1).

The quantitative results ran counter to the literature's optimism concerning the potential of CMC. The average participation (one message/week) was very low compared to other studies. Only one-quarter of these messages were interactive. The mean critical thinking score was 1.83, disappointing.

Bullen conjectured that the poor results were due to several factors: The students were accustomed to a didactic style rather than the dialogical style of their constructivist teacher, to monological content rather than to the multiple perspectives of the topic, and they were unaccustomed to distance education.

This is a rigorous, thoughtful study but there are two concerns regarding validity. First, a message containing minimal use of uncritical thinking but four sentences demonstrating the single skill of *clarification* would score 3. But apparently, so would a message containing one sentence each on *all four* skills. It would surely be valid to award the latter a higher score. Second, concerning intellectual depth of arguments, students communicating mostly uncritical thoughts would score 1, even if their final thought was *brilliantly critical beyond belief*. Validly, the score here should be 3 (or even 3+).

Research study C

Gunawardana and Anderson (1997) analysed the content of an online debate carried out in 1995. Hundreds of international professionals in Distance Education debated over six days on the proposition, *No interaction, no education*. Using grounded theory techniques the researchers constructed a model that emerged from the data, This categorised participants' messages into five phases, each subdivided according to the type of cognitive activity and type of argument advanced:

I. Sharing/comparing of information
II. Discovery of dissonance and inconsistency
III. Negotiation of meaning and co-construction of knowledge
IV. Testing and modification of proposed synthesis
V. Agreement/application of newly constructed meaning

The discussions progressed through the five phases as knowledge was being constructed according to the constructivist mechanisms embodied in the category names. This was a seminal study, advancing the field of content analysis. However, the model appears to fail in one crucial respect. It purports to have revealed: *changes in understanding or the creation of new personal constructions of knowledge as a result of interactions within the group*.

The evidence for such changes seems to be restricted to subcategory C of Phase V: metacognitive statements by the participants illustrating their understanding that their knowledge or ways of thinking have changed as a result of the conference interaction. An example of one such message is: *In the past two days, you have made me stop and think about interaction. I guess you'd call that learning. Without your thoughts this would not have happened.*

The authors take this metacognitive claim as evidence of cognitive adjustment. However, *stopping and thinking* is not necessarily a useful adjustment in itself. Evidence of *learning* would be the participant explaining *what* they had learned about *interaction*, that is, a *description of the cognitive adjustment*. Even then, the quality of that learning would need to be evaluated. Was it deep or was it trivial?

Research study D

Henri and Rigault (1996) describe perhaps the most sophisticated cognitive analysis model for CMC discussions, with five categories (participative, social, interactive, cognitive, metacognitive) and with the subcategories numbering forty. Henri devised these categories based on her experience of discussions, rather than deriving then directly from a particular discussion archive. The cognitive dimension is subdivided to discriminate the level of processing involved in each critical thinking skill. This takes account of *intellectual level*, with which Studies B and C may have problems.

Gunawardana et al (study C) had attempted to use Henri's model to categorise their online messages, but eventually decided to derive their own model, with a constructivist, learner-centred orientation. They saw Henri's model as being teacher-centred and also had trouble using her "units of meaning".

Research study E

Kanuka and Anderson (1998) analysed the content of a three-week CMC conference between managers of workplace learning centres (N = 25). They found minimal knowledge construction. Where it did occur, it resulted from social discord, which acted as a catalyst.

It is interesting that they initially used study C's model of transcript analysis. However, this led to an excessive proportion (93%) of posted messages being categorised into Phase I (sharing/comparing of information). Also, the authors didn't felt uncomfortable with the coding of every message to the five phases. They decided to reinvestigate the data with grounded theory methodology. Only two categories emerged from the data: 1) social interchange and 2) social discord and knowledge construction.

Several reasons were offered as to why this discussion was not as richly varied as that of study C. However, whatever the reasons, it seems extremely uneconomical to have to invent new analysis instruments for every new CMC discussion. This second instrument is unlikely to be useful for the researchers' next analysis. With only two categories, it must lack discriminant ability.

Kanuka et al (1998) note that a transcript may fail to record cognitive change, even when it occurs. For example, participants may not want to share newly constructed knowledge that they are unsure of. This would be especially true if it involved "social discord", as Gunawardana et al (ibid) think is necessary for learning, Researchers would need to work more closely with participants to gain their

trust. Another problem is that some participants may be unaware of cognitive change until it has had time to *simmer*: their views may have been *primed for future change* by the discordant discussion.

Questions for discussion and future research

1. In so called "emergent studies", to what extent are the categories really grounded in the data rather than derived from researchers' prior epistemological perspectives?
2. Do we really need to derive new categorisations to analyse every new CMC discussion?
3. Should models distinguish between Metacognitive and Cognitive and between levels of processing?
4. Do 2 categories lack discriminative ability and do 40 categories force coders to make discriminations that are too fine to be replicated? (see Fahy, Crawford and Ally, 2001)
5. Should "units of meaning" be sentences, paragraphs or whole messages?
6. Messages may not record cognitive change. How to interrogate reluctant participants?
7. How can we detect cognitive change that occurs due to, but subsequent to, the conference?
8. How can we provide learning opportunities that capitalise on inconsistencies and contradictions between participants (recommended by Kanuka et al, ibid)?
9. How can we incorporate activities that help participants become explicit about their own understanding by comparing it with that of other participants (recommended by Kanuka et al, ibid)?
10. What types of tutor intervention are needed for undergraduates CMC conferences (cf Study B)?

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USING COMPUTER MEDIATED COMMUNICATION TO ENHANCE LEARNING IN THE LANGUAGE LEARNING CONTEXT

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Introduction

Computer Mediated Communication (CMC) is used in university classes as an added-component in face-to-face Learning environments as well as in distance delivered instruction. It is also used as the primary mode of communication in numerous and different Learning contexts. With the introduction and use of technology in the form of computers into the Language Learning classroom, a series of new issues have evolved and need to be addressed as regards the meaningful use of this type of technology within this specific area. To this end, the experience gained in using Computer-Mediated Communication (CMC) in different types of Language Learning contexts (i.e. English for General Purposes as well as ESP) is examined, and the relative conclusions are drawn.

Theoretical Framework

Learning, envisaged as the process of constructing meaning from and/or about, and/or making sense of, experience is at the basis of Constructivism. Through working in collaborative groups and learning in authentic environments [2], learners are both expected and encouraged to ex-cogitate and develop personal meaning from the Learning process. In technology-enhanced Learning contexts, CMC is the means by which "learners actively construct knowledge by formulating ideas into words that are shared with and built upon through the reactions and responses of others" [4]. CMC is an information tool, a communication tool, and a generative tool which is able to foster both creativity and problem-solving skills. It is an effective and efficient way to provide generate ideas, information, and communicate with Learners. Furthermore, it supports active learning at one's own pace. The CMC environment encourages the sharing of ideas, discussions, and helps clarify concepts while promoting Learner-Education Facilitator interaction. This type of interaction encourages critical thinking, helps apply newly acquired knowledge, promotes specific communication skills, stimulates discussion, aids reflection, and permits anytime-accessibility,

Overview

L2 Learners in three different areas of Language study learned to use the Computer as a collaborative Learning tool to share and develop their Learning. The three different groups of L2 Learners (all attending the University of Florence) were as follows:

- students attending a course in General English from different Faculties within the University of Florence
- Degree-course medical students attending a compulsory course in English for Medical Purposes as part of their curriculum of studies
- post-graduate students participating in a Master Program in the Design & Management of e-Learning.

The Learners could access PCs from home from their own locations via modem with a PPP connection, from Internet cafès (at special low prices for students) or from the two Computer-equipped Study Halls available to all students on the Florence Campus with a direct connection to the Internet. The Education Facilitator set up the conferences on the Nicenet conferencing platform[1] during the first the semester. CMC was used for assignments on topics related to those examined in class meetings.

Course goals included the following:

- building L2 language skills especially in the area of Lexis
- identifying and using structures for real communication purposes
- getting Language Learners to use real language to communicate
- promoting the use of L2 to express ideas and opinions.

The L2 course was developed a comprehensive syllabus which required Learners to use CMC on an ongoing-basis, and for a variety of purposes. Specifically, the asynchronous communication features were used for several class functions: turning-in assignments, conferencing, participation in Learner-Education Facilitator-led activities, orchestrating small group collaborative writing projects, and attaching files.

Learners were continuously evaluated in these areas:

- Progressive use of L2 to carry out assigned activities
- Lexis & structure development
- Computer-mediated communication, use of electronic mailing lists and use of online journals, and Internet with a partner
- Sites visit
- Original project within a small group
- Class participation
- Portfolio work and log of related activities.

The Education Facilitator was the only one with "controller" privileges, which allow individuals to make changes to a conference and add sub-conferences topics etc. During the semester, L2 Learners developed an interest in how computers can be used to enhance Learning in a variety of areas.

Discussion

Researchers suggest that the very nature of CMC promotes a collaborative approach to learning. Collaborative learning refers to "any activity in which two or more people work together to create meaning, explore a topic, or improve skills" [4]. Collaborative learning through real Peer-2-Peer exchanges using CMC must be structured by the Education Facilitator. Then it needs to be encouraged in a Learning environment in which "learners actively construct knowledge by formulating ideas into words that are shared with and built upon through the reactions and responses of others" [4]. Existing literature presents conflicting evidence of how CMC affects group co-ordination and communication., CMC systems sometimes facilitate, but at other times hinder, the accomplishment of group objectives. Within the present experience, some examples of potentially favourable CMC impacts for learning include the disinhibiting effect, unblocking users' ability to produce ideas, and providing a built-in memory and repository for shared-knowledge.

In a collaborative learning environment knowledge is not transmitted to the Learners by the Education-Facilitator but, rather, knowledge is created in an active dialogue among those who seek to understand and apply concepts. Such environments allow Learners to participate in authentic activities, and to reflect on and modify their understanding [2, 4, 6]. It has been suggested that the very nature of CMC (the capacity to support interaction between and among Learners and Education-Facilitators) promotes a collaborative approach to learning. The ability to read and respond to messages posted to an online group creates an open forum for the creation of knowledge.

The main points which have emerged from the present experience are:

- document-mediated communications play an important role in learning and problem solving
- interactive information resources can provide a powerful new means of supporting such communications.

Document-mediated communications implies those communication experiences in which a document sets the orientation and significantly frames the context and content. The use of these activities suggest that they play a particularly important enabling role for Learners with lower self-confidence or with less prior experience in L2 courses.

Thanks to the Web, the writer-reader relationship is not onlyin the process of transformation, but it is also re-defining what documents are, and how they are used. Documents are no longer static *artifacts*. They are being transformed into dynamic, interactive *artifacts* that can be produced and used by the user e.g. hypertext documents. In collaborative learning experiences, L2 Learners are engaged in a series of activities which promote critical thinking. These include offering help, organising materials and suggestions for the peer-group, thinking critically about ideas, concepts and the articulation of ideas[5].

Conclusion

In many ways, the use of document-centred activities in these course can be considered a success. Learners used the system constructively. CMC participation was a course requirement however, the fact that Learners spend time writing detailed and specific assignments and submitting them through the conferencing system shows that Learners were open to using CMC and understood its collaborative role within the courses.

Because computer-based environments enable the creation of multimedia documents, it is only fitting that the document-mediated communication that takes place should make use of numerous forms of media, as happened in these courses in which the use of multimedia included images, animations, audio and video clips as well as text.

Things which can be identified as obstacles to successful use of CMC in L2 Learning contexts included :

- lack of computer literacy
- initial unfamiliarity with using a text-based communication system for concentrated learning experiences
- occasional technical problems in accessing the university server from off-campus.

However, thanks to Learning involvement and collaboration these difficulties were overcome.

From an Education-Facilitator viewpoint, use of computer technology in the L2 Learning context introduces increased risk including the possibility that the technology will not work, that technical hitches will occur during the class period, and that Learners will experience frustration and possible discouragement related to technical problems. Nonetheless, this situation constitutes an important learning experience in which L2 Learners are faced with "real world" crises and have the opportunity to learn from the L2 Education-Facilitator and other Learners about how to cope with stress and the unexpected. It also reminds Education-Facilitators that the planning of back-up procedures are critical when using any type of technology in the L2 Learning context.

Periodicals and scholarly research, as well as other discussion forums, focus increased attention upon the use of CMC to enhance learning. CMC is an important educational tool because of its effect on the Learning processes, and the way in which it changes the rules of communication, and impacts the manner in which Learners enhance their Knowledge (i.e. Knowledge as the capacity for effective action). In this context, CMC is a rich learning environment for L2 Learner knowledge enhancement through document-based activities. Document-centred activities facilitate learning opportunities within work groups by encouraging collaborative work among peers on a set of text documents when using CMC, i.e. shared resource-documents provide an effective opportunity for developing Learner Activities through CMC.

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COLLABORATIVE LEARNING IN BUSINESS EDUCATION: EXPERIENCE WITH A WEB-BASED COURSE AT THE EUROPEAN BUSINESS SCHOOL (EBS) IN GERMANY

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Introduction

In this paper a shift in pedagogical approach in business education which is necessitated by demands for competitiveness for both the business schools and their products - the graduates – is discussed. Traveling paradigm and specifically the collaborative learning approach in a web-based course environment is argued to be more effective than the traditional, transfer, one. The practical implications are elaborated on a case of a www-based course on Organizational Development at the European Business School (ebs) private university in Oestrich-Winkel, Germany (www.ebs.de).

Pedagogical Approaches for Business Education

For years the dominant pedagogical metaphor in business education has been the **transfer** metaphor. The major premise of this pedagogy is that knowledge is transferred from the instructor to the students by means of lectures, speeches delivered by guest speakers (leaders from the relevant business fields), backed up by textbooks and duplicated course handouts. The instructor is the only source and distributor of the information. Locus of control and monitoring is an external one. Students compete for grades which are to measure how successfully the knowledge has been transferred. Those who succeed in this struggle are granted a diploma which certifies what specific knowledge and in what amount has been transferred. Whether learning occurs along the way no one can guarantee. This clearly is not the most effective approach, but it is still the most commonly used one in business schools. The experience with corporate management training also confirms this (Meister, 1998).

In order for business schools to prepare competitive graduates and thus be competitive themselves in the highly dynamic and ever-changing business world, the education should be organized around a radically different approach. Baets (1999) suggests that the **travelling** metaphor is particularly effective. The teacher-student roles and relationships differ significantly from those imposed by the transfer approach. The student is the explorer and the teacher/tutor is the experienced traveling companion, a guide who helps to find the way by providing maps and a compass. The traditional role of the learner, who once used to be only a user of instruction, shifts to the one of the producer or co-producer of the instruction (Margaryan, 1998). Here not only a role change takes place, but a more comprehensive culture change occurs (Collis, 1997): students develop responsibility for their own learning, construct their own knowledge, according to their own preferences and interests, and what is most important, **learn how to learn**. Locus of control and monitoring shifts from external to internal one. The teaching (if it is at all a suitable word to use in this context) is carried out mostly by experiential methods (case studies, small-group discussions, simulation games, project-based work, collaborative problem solving, self-directed learning). Such educational environment is targeted at developing higher order skills in students (van Merrienboer, 2001): critical thinking, problem solving, monitoring and assessing their own performance, as well as performance of the others, self-directed knowledge acquisition, meta cognitive skills of locating information, as well as information processing including information analysis, synthesis and evaluation (Romiszovski, 1997). Thus, students learn to work on their own development. Management educators know that becoming a manager is to a large extent working on one's own personality. It could be argued that a committed and mature approach of the student combined with an experienced travel guide – the tutor– is the ideal learning situation for the business education.

Collaborative learning as a pedagogical method to support education centered around the traveler's metaphor: experience with a www-based course 'Organizational Development'

Collaborative learning is one of the experiential learning methods discussed above. It has emerged in the last 30 years and is an effective pedagogical environment where students work together in heterogeneous group to achieve a common academic/training goal, e.g. completion of a project, an assignment or a case study (Glass/Putnam, 1988). The basic principle is that group learning fosters more achievement and growth than individual learning. Collaborative learning benefits the individual student as well as others in the group: the activities (and the outcomes of those activities) of the group exceed the sum of the individual students' work, thus bringing about a **synergy**. The power of this process is elaborated by Rowntree (1995): 'Participant are liable to learn as much from one another as from course material or from the interjections of a tutor. What they learn, of course is not so much product (e.g. information) as process – in particular the creative cognitive process of offering up ideas, having them criticized or expanded on, and getting the chance to reshape them (or abandon them) in the light of peer discussion. The learning becomes not merely active…but also interactive'. The ideal outcome is a development of highly productive collaborative learning.

Traditional educational system is competitive rather than collaborative. This is mainly due to the fact that the former relies heavily upon a competitive grading system. Competition for grades often establishes a negative interaction among students. This is the ***"me"* approach**, which is in direct opposition to one of the major priorities of today's business world – the need for cooperation, mutual support, and problem-solving in team projects, which, in turn, creates the need for an interdependent ***"we"* approach**. This is what the today's business schools' curricula most often lacks.

Shifting the educational culture from 'me' to 'we', helping the students develop their higher order skills and develop personally preparing to enter the world of business were the rationales for designing and offering a web-based course on Organizational Development (OD) to the 2nd year students of the European Business School (ebs). The ebs is a small private university in Oestrich-Winkel, Germany. Founded in 1971, it provides courses leading to a degree of Diplom-Kaufmann/Kauffrau (equivalent to the MBA degree). Online teaching is still in its infancy: the course described in this paper is the first attempt to deliver a course entirely through the Internet.

This one-month modular course covered the major aspects of OD and was aimed at providing students with knowledge and skills in five major areas: planning change; diagnosing organizations; data collection, analysis and feedback; OD interventions; and evaluation of change.

The study material was posted on a website specifically designed for this course: it included an electronic textbook, and a library of course-related materials – online articles, books, external websites. The communication was carried out through e-mail. Students were given a possibility to participate in a forum, where they could discuss various topics pertaining to the course, problems they encountered while working on the assignments, as well as post their assignments for others to view and comment on them. There was only one initial classroom face-to-face session aimed at helping students understand the 'rules of the game'. Beside e-mail and telephone feedback, students were offered an option of face-to-face consultations with the tutor during her office hours.

To pace their individual study, the students were provided with an online schedule, and each module had its objectives listed so that the students could check themselves at the end whether they learned what it was intended for them to learn. Upon completion of each module, in average one week in duration, students were required to work on case studies to apply the theory they learned in the module. The students then e-mailed their solutions to the tutor and received a feedback/grades by e-mail as well.

An important characteristic of this course were the experiential learning tasks which were designed to involve a great deal of collaboration. Students had to form groups of 4-5 people to work on the case studies. They were given the freedom to do it themselves rather than being assigned to groups by the tutor. Case study solutions submitted by the groups have been assessed on the basis of creativity in approaching the problem, depth of problem analysis, style and quality of presenting the solution. Participation has counted towards the final grade as heavily as the product itself (case study solutions) did.

Students approached the course assignments very enthusiastically and creatively: some groups went as far as forming virtual business consultancy companies where every member had his/her own role in working on case study solutions (one would be responsible for organizing the brainstorming sessions, the other would do a literature overview on the similar problems, yet the third one would be responsible for putting it all on paper, preparing a PowerPoint presentation or just a plain word document report).

There is an important point to be made on this example: we cannot and should not intervene in the configuration of what we pre-design. We can design learning tasks with a certain pedagogical approach in mind (in this case – collaborative learning), but once the process runs the students re-design or modify this approach to best suit them (in this case – some groups brought elements of role play, game, into the activities). This is a positive sign of students assuming an active role in their learning. It can be argued though that this motivation is still brought about by competition for grades rather than for the sake of learning itself.

We believe this course was successful in helping students to experience team work and problem solving in groups, and developing their soft skills. Upon the completion of the course, we asked students to comment on their experience and here are some comments from them:

'' Although this was the first time such an unusual course took place at the ebs, I personally felt very good about it, it was interesting, challenging and surely supported the team work skills. The content was very sophisticated and demanding, though it was very close to reality and provided with a feeling of really applying theoretical background on real situations and problems. The group size was okay even if there have been exhausting discussions on the subjects. The work load was a way too high for the credits offered initially. The feedback could have been a little more detailed although I thought that your idea of face-to-face feedback in your office was okay as otherwise there would have been no contact to the department at all…'' (N.G.)

'' I particularly liked the idea of *applied* organizational theories. However, the cases often seemed not typical of usual situations in business life - most of the time I had the feeling of still doing theoretical work on another level. This may be due to the abstract description which was rather close to the original course assignment (real theories). Despite these facts, I enjoyed taking the course and do not regret having done so. The group mixing was heterogeneous, for most it was a new experience in advancing their soft skills'' (N.K.)

This course was a learning-intensive experience for us at the department as well. The major challenge was the lack of an e-culture in the school's academic curriculum. However, the course was a success. And of course we learned our lessons, too:

1. Effective feedback is of major importance. And it is very difficult 'to do it right' 1) in an experiential learning environment, and 2) with large numbers of students. How are we to judge performance on such a rich task as a case study, where there is no right or wrong solution? How are we to provide a timely and meaningful feedback to a class of 75 students?

One solution could be to delegate the feedback task to the students themselves (by means of peer assessment, self-evaluation). The tutor can then moderate these processes, but the largest part of the job will be done by the students themselves. And from organizational point of view, with large groups of students proper staffing is important (more than one tutor to be involved in a course). This leads to another important condition for successful online education,

2. Existence of a supportive organizational infrastructure and coordination of efforts between various university services (Registrar's office, Course Scheduling Service, etc.) and the course designer(s)/tutor(s). Top-down endorsement is crucial. In our case, for example, we had to negotiate the student grading regulations with the Registrar. The grading rules that the university had would impose problems with assessing group work.
3. In order for collaboration to be effective students must feel comfortable in the communication format selected. Often more technology is frustrating rather than beneficial (especially when

learners are inexperienced). One can achieve a lot with simple asynchronous communication method (e.g. forum and e-mail). The choice of technology should be tied closely to the goals of instruction, and consider the experience of the learners. Students also must be convinced that the collaboration would be beneficial for them, they must see the added value of learning together. Student comments in our case show that we were successful in conveying this message to them.

What is the consequence of the application of the pedagogical methods and learning paradigms suggested in this paper? In order to be competitive, business schools need to focus more on the process of management rather than all the theory around it. And of course the approaches discussed in this paper are not the only universally applicable ones. A search for one best solution is doomed in that there exists none. Business schools have to modify the theory in order to adapt it to their unique conditions and educational goals.

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COOPERATIVE LEARNING & WORKING IN A VIRTUAL ENVIRONMENT: A CASE STUDY

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The context

The Open University of Catalonia (*Universitat Oberta de Catalunya, UOC*) was recently created to provide distance learning university-level education. The UOC has introduced an innovative pedagogic model which guarantees the quality of educational materials, continuous assessment of the students and easy access to tutors, professors and university resources.

The Open University of Catalonia is a new model of university whose educational system is based on the concept of the "virtual campus". The virtual campus exists in the form of a communications network which covers and interconnects the entire territory of Catalonia, overcoming obstacles of time and space and providing personalized contact between students, professors and the UOC.

Via the "virtual campus" students have access to the internal databases of the University (virtual library, notice board, team projects, and so on), can make inquiries, and can carry out administrative formalities (registration, certificates, and so on). Also, either from home or from their regional county center, UOC students have access to external databases, to the libraries and services of other Catalan public universities and even to the Internet.

All courses offered at the UOC are structured around a core of required and optional semester-length subjects. Each subject, in turn, consists of various modules (sequential study units) with specific learning objectives.

Introduction

In this context, one of the basic present education challenges is to prepare people to be able to participate in an information society in which knowledge is the critical source of social and economic development. In this society, productive collaboration is the key issue of interactive organization networks that are open to constant changes.

The net facilitates access to resources asynchronously without geographical and temporal limitations, promote interactions and can exchanges, improving quality due to larger interaction opportunities. In this way, students can share and participating the teamwork, attending to at the same time, their own timetable and working spaces. Then the space & time obligatory nature of the synchronous as an absolute conditional disappear for the working development with other friends.

The conflict resolution cooperatively, will allow the possibility to acquire certain abilities like exchange of ideas, contrast different points of view, the confrontation of opposite ideas, etc. that integrate different forms of knowledge, abilities, aptitudes and attitudes that are considered important in view of the requirements that social laborer realities require.

As we can see, learning on the net facilitates new forms of collaborations for students as well as teachers, which favor shared knowledge without any need of geographical coincidence.

In this situation, a group of professors of the Open University of Catalonia (*Universitat Oberta de Catalunya*), of Multimedia and Informatics studies, try to implant the necessity to enrich the present learning spaces with the possibility that students are able to develop a virtual form of teamwork, initiating strategies that provide and promote a more agile interaction between professor, students and the resources that the net provides.

With this end, there are two initial objectives:

- Systematize cooperative working processes, in a virtual environment of a pedagogical viewpoint, to facilitate learning and apprenticeship processes to student and professor.
- To identify the functionalities and adequate tools that help in cooperative working processes, in virtual environments and that adapt to different proposals and learning situations.

Description of reviewed cases: A pilot experience

A pilot experience of work and cooperative learning is underway in virtual environment within a curricular design of four subjects with objectives, concepts, and methodologies which are very differentiated.

In each case the implementation demands an adaptation of the professor on each subjects, in reference to a series of variables, for example, the size of the group, the composition (heterogeneous or homogeneous), rules that should direct the activity, organization of working spaces and resources, evaluation strategies, and the different roles that students can assume.

Four subjects were chosen, that in their curricular design included a team project:

Multimedia and Communication: The subject of Multimedia and Communication is transversal and introductory for all students that accede to the university and therefore, those students that begin a learning process of a virtual form.
It facilitates learning process of a virtual environments, knowledge of basic tools and promotes the analysis of TIC. Students develop a research project on a team.
In this subject, 600 students worked on various teams.

Software development methodologies: A subject that pertains to the study of informatics systems. It is centered upon the study of different strategies, representation of data on a computer using programming language, and using the idea of an abstract type of data, like a connecting theme for the presentation of these strategies. This project is done with a team.
The scheduling that is made is divided between the different members. Therefore, it is indispensable to develop strategies in order to learn how to organize the tasks in a group.
70 students worked on different teams for this subject.

Informatics Applied to Management: a subject that pertains to the study of Informatics and Multimedia and the studies of Economy and Business.
It's a subject based on cases that the students resolve working on interdisciplinary virtual teams.
80 students participated in this experience.

Multimedia Graduate Workshop: a workshop of a month's duration.
This has two objectives: Introduction to a tool to acquire knowledge in order to publish and edit web pages, and on the other hand to practice cooperative working abilities in virtual environments with the aim to establish exchanges between students that share this experience. Students work on a multimedia project in teams.
100 students worked in this workshop.

The following up and collection of data of the working teams in each of the subjects lead us to obtain some significant considerations in relation to the develop of cooperative work in a virtual environment, in an academic university framework.

These significant considerations are as follows:

Contributions of our work

By implementing cooperative work in these courses, our research enabled us to explore several possibilities that are related to the two main objectives we set initially. From a methodological point of view, this allowed us to identify that the progress of learning groups in a virtual environment goes

across four critical phases that require defining specifications which are quite different from those applied in individual learning in virtual environments. In particular, based on the two main objectives defined before, we obtained the following results:

In virtual cooperative work, a group goes through four phases or stages during its learning process. These phases can be more or less evident o flexible depending on the working goal and methodology of the course at hand. They prove to be critical for a virtual working group since they represent moments in which important decisions have to be taken and changes may be effected as regards the group dynamics.

These **phases** are the following: *Group formation, consolidation, development* and *closing*.

A. Group formation: This is the period in which working groups are formed. It is important that students themselves are actively engaged in forming the groups, being conscious that this phase forms part of their working process. Nevertheless, in some courses where timing is short, as in the case of Multimedia Studies laboratory, the tutor forms the groups in order to optimise time.

Taking into account that students study in a virtual environment, they do not know each other; for this reason, they should take the initiative to make proposals to their classmates to form a group based on information that their classmates presented about themselves previously. After a group is formed, it should be communicated to the tutor for final approval.

B. Consolidation: At this instance the groups have been formed and they are prepared to initiate the laboratory activities proposed to them. Before real work starts, though, it is the time when the group members should break the ice and get to know each other more deeply.

In a virtual environment, this moment is important for two main reasons:

1. It constitutes a warm-up activity before the group starts working on real learning activities.
2. It gives members the necessary time to make initial contacts with each other. In a non-distance educational environment, once formed, a group sets up a meeting and can start working immediately; instead, in a virtual environment it is advisable for a group to spend some time trying to establish a good organisation and planning of the work before starting it right away.

Moreover, at this moment the group has to decide who is going to realize coordinating tasks, how to organise the shared space, how to plan the timing of the work, agree on decision taking processes as well as on the frequency the group is going to communicate, etc.

C. Development: This is the phase when the group applies and puts into practice all the decisions taken as regards scheduling and organisation forms, task sharing, etc. and when each member work cooperatively to carry out the assigned tasks.

D. Closing: Once a group has reached the definite resolution of the project, every member realises a self-assessment of the work process carried out. The aim of this self-assessment is to give the chance to each member to evaluate the work done, the progress made as regards the learning of the tool, and the process followed by the group.

Examining the phases that a group goes through in a virtual environment, we have observed that the **tutor develops a role and different tasks** as a response to the needs a students presents at each moment.

At the **Group formation** phase, the guidance the tutor may give to the students can be materialised in the following tasks:

- Information: guides and resolves issues that a group may set as regards group work in a virtual environment.

- Regulation: influences on the direction task organisation of the group should take; inform to the group, if it is necessary, on task organisation, how to initiate an activity, how to adapt the planning system better, etc.
- Support: promotes the proper conditions that enable group consolidation and better task development; encourages group organisation, shows his/her support explicitly when the group needs it and tries to be always aware of how the group proceeds its work in the shared space.

At the **Consolidation** phase, the tutor intervenes in the guiding and orientation of the work when this is necessary. In fact, he/she intervenes when the group needs him/her to resolve a doubt, etc., so he/she always tries to keep a prudent distance by providing the group sufficient liberty in order to acquire autonomy.

The tutor does not intervene directly nor shows an excessive protectionism and control towards the group; instead, in case of doubt, conflict, etc., he/she always expects to be the students that they ask him/her for help.

When the group developers its internal organisation, task sharing, planning and timing, it may choose to show the resulting document to the tutor so that to get his/her opinion as regards the adequacy of the plan and thus be reoriented in case the tutor perceives that the working calendar is difficult to be fulfilled.

At the **Development** phase, once a group has started working on the web elaboration task, the tutor will just wait to give his/her support whenever students will ask for it, or when they have a doubt about the content, or when they face a conflict among them, or even when they get stuck, etc.

Often, it is the students themselves that come to ask the tutor's intervention in order to resolve a group conflict: a member unexpected withdrawal, lack of commitment to accomplish the deadline for handing in part of the work, excessive leadership of a member who goes against consensus, etc.

Finally, at the **Closing** phase of the group work, it is important that the group is able to close the process followed by evaluating not only the resulting work but also the attitudes and relationships that have been maintained among all members. For this reason, the tutor establishes and foments a common discussion space where students can consolidate their cooperative work process by generating common feed-back capable of assessing both positive and negative aspects of the experience. The teaching strategies always aim at offering support to the organisation and planning processes of all working groups, without imposing it.

By observing the working groups in the scope of the different educational actions that take place in the whole experience, we were able to identify that, on the one hand, the tutor should develop certain strategies and elaborate several activities that enable the accomplishment of the goals set in each phase. On the other hand, it is important to point out the active role that students should play with respect to their own learning process in order to achieve a successful task planning and timing, group organisation, task sharing, etc.

In order to the second objective of our experience: To identify the functionalities and adequate tools that help in cooperative working processes, in virtual environments and that adapt to different proposals and learning situations:

Tools for a collaborative learning in a virtual campus

Essential Characteristics: Focus on student needs; User friendly; Easy to learn and to use; A clear interface; An Internet tool

Functionalities: Accessing, filing, retrieving, sharing, sorting, ... Information; Spaces for group creation, group interaction; Communication flow: shared spaces: debates, forums, decisions, chats personal and direct: mail box, ...History of objects; Versioning; Calendar, address book, planner, ...Awareness: monitor, instant messages, ...Tools for evaluation; Virtual Presentations.

The tools and functionalities that can be able to promote a cooperative virtual work should present three fundamental requirements:

1. Communication and information exchange (between students and between students and professors)
2. Organization and management of information in the team

1. The tools designate to communication and information exchange in the Virtual Campus, they are Electronic mail and synchronous mail:

The **Chat** is frequently used for making some decision quickly, to deadline in which the group have to present some activity or to consult some question, etc. So, in moments which synchronous is necessary.

The Electronic Mail, allow to obtain complete information, more elaborated doubts to the friends or to professor.

It's allow that the answers be more analyzed. Allow to attach some documents quickly, it can to direct all members of the group and they can consult in the moment that they want.

2. For sharing and management the information, the Virtual Campus have the Share Disk, that allow to work and management the fields in a shared form. All members can to share all documents that they work and elaborate together, they can review it, to make modifications on documents, etc. Each member can create or eliminate fields.

To this space, all members of the group have access for making modifications. It's require a high organization of the work space.

We make stand out that the exchange of the information in the group, and organization and management the information in a virtual team, involve the following aspects:

1. That all members of the group have access and to share the same information, for they can a clear vision of what its happening into the team, what are the actions that they are doing and the unsettled tasks.
2. To elaborate documents cooperatively asynchronously, that all members can to review and make the necessary modifications on the document.
3. To classification the messages and the documents, for categories or subjects,
4. To converse and to make decisions related to solve questions about exercise, for obtaining a high level of cooperation and integration. It's necessary to establish a system more flexible than the traditional electronic mail.
5. To organize and control the roles and tasks during the development of the activities.
6. To collect different kinds of information.
7. To create, eliminate and to management the information shared between the members of the group. It will be necessary to reduce some problems about the fact that different members working with the information synchronously.
8. To organize all information in the work space in a simple, flexible form, following the criterials of each subject.
9. To share and search for information cooperatively, with tools that allow tasks related with the research
10. To know what is the state of the tasks of the other members of the group.

However, in order to be able to generate this knowledge based upon the relationship of it's members, it is not only necessary to have technological support which allows cooperation and interaction, but it is fundamental to systematize the process, to control all of the elements that intervene and to conduct skills of cooperative work on the net environments.

As we can see, to systematize a training process of team work contributes to, on the one hand to acquisition of cooperation habits that allows the student to transmit it to other situations, beyond the academic environment, and on the other hand allows to identify those key elements of team-work in a virtual environment.

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HYDROWEB: 'WEB BASED COLLABORATIVE ENGINEERING IN HYDROSCIENCE' A EUROPEAN EDUCATION EXPERIMENT IN THE INTERNET

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Introduction

The Internet and the World Wide Web are seen as innovative IC-Technology that offer new opportunities to support civil and hydroengineering projects using distributed, computer and network based project platforms. Concepts and implementations of such kinds of project platforms are now available. However the application of these solutions and corresponding suitable working processes have yet to be introduced to education and practice in water related engineering. Working on the World Wide Web, collaboration on projects with colleagues from other disciplines and nationalities as well as sharing information in common working spaces is not only a theoretical matter and a question of software installation and application, but even more a matter of acquisition of experience and the development of a 'technical culture' in the engineering society of today. This can only be achieved by practical experiments and exercises. Traditional course programmes in engineering do not cover collaborative engineering. To overcome this gap universities from Berlin (D), Budapest (H), Cottbus (D), Delft (NL) and Grenoble (F) and Iowa (USA) organised the course 'HydroWeb: Web based Collaborative Engineering in Hydroscience' in June 2001 for the third time as a common distance learning and training course for students and practitioners.

European Course Framework

Open and distance learning opportunities such as the HydroWeb course can be only developed and performed in an international framework. HydroWeb is one of the outcomes of ETNET 21, the European Thematic Network of Education and Training for Environment-Water (http://etnet.vub.ac.be) part of the SOCRATES Programme of the EC. This network is represented by more than 75 partner institutions in 26 countries and integrates five specific projects. SPII (Distance Learning Opportunities) and SPIII (Virtual Laboratories) are the leading SP for HydroWeb. To address practitioners the course is also an activity of the professional organisation IAHR (International Association on Hydraulic Research and Engineering) esp. the IAHR-CEPD (Committee on Education and Professional Development) and the IAHR-EGW (European Engineering Graduate School Environment Water). The European activities and research in open and distance education in the field of water-environment related engineering will be presented on the EDEN workshop in details.

Course Concept

The idea of the HydroWeb course was simple: Students and practitioners from different locations in Europe were given a hydroengineering task that had to be solved within one week by small distributed teams using Web based tools and techniques. Each team was composed of about eight participants from at least three locations and different disciplines to ensure an international and interdisciplinary collaboration. The teams operated as independent units. The organisational structure, work plan, work distribution and co-ordination inside the teams were defined by the team members themselves. This meant that a team as a whole was responsible for the performance of the given engineering task without any instruction or influence from outside. As opposed to reality in practice, nobody could really lose such a game - the collection of experience by success or failure is always profitable from the point of view of education and training. By 'playing' this game the participants acquired knowledge, experience and competence in Web based collaborative engineering. In this way they might be better prepared for future challenges: to operate on a global market in international and interdisciplinary project environments and companies.

The composition of the 62 course participants was really heterogeneous: fifteen nationalities and an age distribution from 20 to 40 years leads to a mixture of different cultural and educational

background as well as different habits, languages and social behaviour. The success of the course demanded as a prerequisite elementary skills to operate in the Web environment, basic knowledge on the theoretical background in hydroengineering, the ability for creative and responsible engineering and, most importantly, the willingness to co-operate with colleagues from other countries over the Internet. To ensure the equal level of the participants selected lectures were held at all locations in seminars (using distance learning technologies) in advance of the course and common lecture notes were shared in the Internet. In this way the course is a combination of open distance education/training and Web based collaborative engineering to prepare the participants for Long-Life-Learning and modern engineering.

Engineering Task

The engineering task was the design of a flood protection system for a conceptualised river, based on the river Vida in the south of Denmark. The river discharges into the sea so that tides and surges affect the downstream reaches. The river is highly controlled by weirs and gates as well as some limited dredging to protect the river from tides and surges, to ensure the passing of floods from upstream after long rainfall, and to allow navigation with small pleasure craft boats at any time. The objective of the exercise was to introduce structures into the river, with the original data set being given without any structures, to ensure a suitable river management. Boundary conditions were given for a specified time period. This kind of engineering task allows to simulate a typical engineering project from practise adapted for the purpose of education/training course.

Web based Course Platform

The course platform was designed to overcome the spatial distribution using available Internet and Web technology. Local facilities supported the participants at their working location, defined the individual working environment, and were mainly composed by standard PC's, Internet access, Web browser, conferencing tools (NetMeeting) and course related engineering software (Mike11). The shared facilities supported the collaboration inside the different teams, as well as organisation, observation and advice from the supervisors based on the principle of 'information sharing' in addition to traditional 'information exchange'. The shared facilities were composed of Web services for each team and the course as whole, accessible for all course participants. In this way the student teams were able to define their own shared working environment. The Web services were provided by one central Web server installed at the BTU Cottbus, including shared file service, shared document service, bulletin boards and email lists. Details of the course platform are described in the WWW: http://www.hydro-web.org.

Course Results

All seven teams delivered their proposed solutions for the given engineering task within the time allowed. The seven solutions were different in type and in terms of the locations of the river management objects/structures (weirs, dikes, dredging). They demonstrated a range of appropriate engineering alternatives for the management of the (conceptualised) river Vida. Of course the proposed solutions were not developed in terms of practical designs - the course duration of one week was too short to optimise the solutions, especially under economical constraints. Nevertheless, all seven teams were able to develop a reasonable engineering solution in a short period of time using the World Wide Web as a collaboration platform to overcome the spatial distribution of the participants.

Engineering Reports

The progress of work during the course and the engineering solutions were documented in reports. Short daily reports from each team contained the current state in the engineering task, and described the work steps, problems, difficulties and exceptions from the work plans, collaboration methods and decisions made by the team. The supervisor's daily assessment commented on the daily progress made by each team and also contained administrative information and hints. Each team produced a final report at the end of the course describing the engineering solution and their collaborative experience. All reports were prepared and distributed as Web documents on the course platform (see http://www.hydro-web.org).

Collaboration Experience

The main target of this education experiment was the acquisition of knowledge and experience in Web based collaboration. This target was achieved in that all teams gained new experience in applying collaborative Web tools as well as in team work, information sharing, project co-ordination and reporting ('Learning by Doing'). From a technical point of view the facilities provided were appreciated and used between the different locations. Interesting experience was the extension of traditional information exchange tools by information sharing opportunities. Most participants were accustomed to exchange information from one personal working environment to another but not to share information in common working environments.

Email was well known and was therefore used most of the time for news and file exchange. The participants recognised that an email to a single team member (1:1 message) lead to a lack of information for other team members. For this reason they used increasingly the bulletin board facility and mailing lists (1:n message) to share news and the common Web space to share files and documents. In this way they learnt in an intuitive way to apply information sharing with the related problematic nature of access control, joint editing and responsibility.

NetMeeting was used by all of the teams as a general tool for conferencing and discussion. NetMeeting supports audio/video communication for point-to-point connection of two locations. Fascinated by these features the teams started to communicate by this tool. But team members from a third location could not join the conference, so most of the teams used for their shared discussion the chat module and the whiteboard of NetMeeting. This tool allows several team members at different locations to discuss various topics. A particular highlight of the course was two general chat sessions to discuss the content and structure of the final report. In these sessions twelve participants in total (five supervisors and seven team representatives) from each of the locations were connected over the Internet without any technical problems (nxm discussion). Further important feature of NetMeeting for this course was the application sharing module. This allowed partners to share an application over the net. For example, a participant in Cottbus was able to control a Mike11 application running on a computer in Delft, and to discuss in parallel during a chat session with the other team members in Delft, Budapest and Grenoble the location of weirs and the impact of the water level. In this way the teams were able to share information and to discuss them interactively online as a team. This was viewed as an important step compared with the traditional approach of information exchange by file transfer and email. The successful application of Web technology for group discussions demonstrates the potential of information sharing for distributed project co-ordination.

All teams presented their results in a final report as a Web document. It was the first time that most of the participants had to write a report as a team and as a common Web document. Using the interfaces of standard documentation systems (like Word) or standard HTML composer the participants were able to produce a Web report in collaboration (joint editing) and to share it on the Web platform without the additional effort associated with the traditional paper based documentation and information exchange.

Besides this experience in the application of Web tools the participants improved their ability to work as a team. Most participants started the project with high motivation and a lot of ideas focused on their individual activity - as they would normally have done in their study exercises. On the second day, however, they found out that the other team members at the other locations did not necessarily take up their ideas and approaches - they followed their own ways in parallel or in different directions. There was some disappointment in the teams about 'collaboration', so they began to communicate and to discuss the different approaches they were using. By the end of the second day all teams had found by this 'trial and error' experience a suitable collaboration method including communication rules, co-ordination methods and the specification of responsibilities. In this way the teams were able to develop a common team solution for the engineering task and to present it in a common report - not as independent solution and reports from each team member/location.

Social Aspects

The teams were composed of participants with a heterogeneous background in language, mentality, education, culture and habit. This was representative of an international and interdisciplinary collaboration. The level of competition was low because of the non-existing commercial pressure at educational courses. It was observed that all teams started their communication actively but retained a formal approach to each other. During the week the communication became more and more direct, and included the exchange of personal information such as the exchange of photos of children. A 'course society' arose with personal relationships. Insides the teams the members found their roles defined by their competence (e.g. in Web reporting, numerical simulation, project management). They learnt to accept each other's particular competence and to combine their individual abilities towards the common success of the team. The joint work inside the teams led to a better understanding of their different characters and background. In just one week the students acquired a considerable amount of ’social competence’ and ’soft skills’ inside the teams as well as inside the society formed by the whole course. Nevertheless there is one important improvement to be made for the future: a face-to-face meeting of all participants as a kick-off meeting was missing. The net cannot substitute for the personal impressions and relationships of a real face-to-face meeting and the benefits of a social event like a drink and talk at a bar in the evening. This would help to advance the course performance and to set up better understanding inside the teams.

Conclusion

The course as described above was an ambitious educational experiment to extend the normal course programme in engineering by a new topic: Web based collaborative engineering in international and interdisciplinary projects as open and distance learning opportunity. The effort in terms of preparation and implementation was large, and not all of the planned objectives were achieved without problems. However the experiment worked well; in particular the participants were able to work collaboratively via the net beyond all differences in language, nationality, habit, age, culture and educational background. The results and comments of the participants demonstrated the potential and importance of Web based collaboration for future open and distance education/training in water related engineering.

The important issue has become one of developing a ’technical culture’, that is, the ability and working methods associated with the application of modern information and communication technologies to distributed project platforms in a beneficial way. The course gave all participants valuable experience in this respect. We believe that such kind of open and distance learning courses will become a standard part of academic and professional education/training programmes in the future as they reflect the progress of the ongoing ICT revolution. Internet based, international and interdisciplinary courses require considerably more effort than traditional courses but there are no alternatives to the acquisition of competence in this field.

References

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TUTORS' FORUM
PLATFORM FOR TUTORS' INFORMATION AND COMMUNICATION

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Introduction

The distance learning study programme of the Business School started off at the Faculty of Economics in 1995. The programme implementation involved study materials development, training of different categories of participants (tutors, course writers, administration staff, etc.) and also the setting up of a student information system based on the Internet.

In the first five years, the evaluation pointed out different problems related to tutors' inadequacy to efficiently carry out their tasks, especially with regard to group tutorials. One of the actions taken to improve the work of tutors is the creation of the web site »Tutorski forum« (Tutors' forum), designed as a platform for tutors' information and communication.

This paper presents different components of the Tutors forum and their purpose.

General outline

EF tutors' mission is to be in communication with the teachers at the Faculty responsible for different subjects and/or their assistants, with the administration staff (DL office) and with the local study centers where tutorials take place. Tutors have pointed out that they have few or no contacts between themselves and welcomed the idea of being able to communicate.

The tutors have actually found themselves in the same social isolation as the DE students. As a result, it has become absolutely necessary for them to be able to get in touch with each other, both on the level of study centers with all the tutors working on the different subjects but same students, and on the level of subjects, i.e. with all the tutors working within the same subject, such as mathematics, business law, microeconomics etc. but in different study centers.

The activities to support tutors have been carried out in three directions. First, a handbook »The Role of the Tutor« has been written to provide tutors with a relevant theoretical basis for their work. Secondly, workshops, focused on effective tutorial methods, have been conducted in different study centers to bring tutors together and give them some practical suggestions for their work. Finally, the web site »Tutors' forum« has been designed to enable tutors to communicate and exchange information about their work independently of their location and of the faculty or study centers services.

The access to the web site Tutors' forum is public - http://www.ef.uni-lj.si/admin/snd/forum. However, only tutors of the Faculty of Economics can publish their messages or create forum discussion groups. Tutors access the web site facilities with their user name and a password. The use of Tutors' forum is explained in detail in the above-mentioned manual.

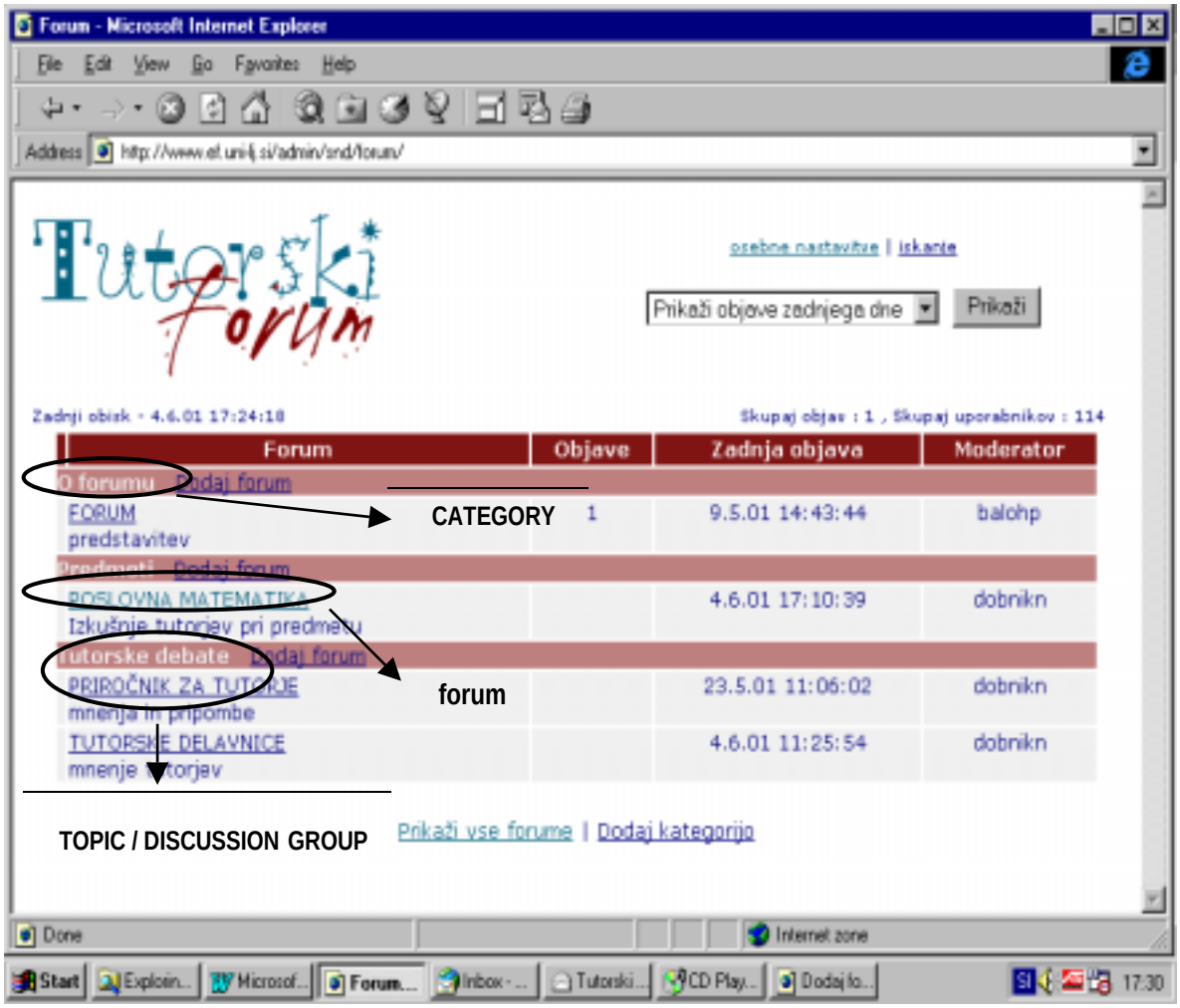
Components of the Tutors' forum

Tutors' forum offers the following:

- The possibility to participate in existing discussion groups (within existing "categories" and "forums")
- The possibility to create a new topic and animate a discussion group (within existing "categories" and "forums")
- The possibility to create a new forum within an existing "category"

The site home page presents basic information about the forum, such as when the site was last visited, number of publications, and a number of registered users. Categories are presented in the middle, with forums created within categories and discussion groups created within existing forums.

On the home page, it is possible to enter personal settings, search options, and choose the view of messages and publications on the Forum by the period (last day, last 2, 5, 10 days).



Tutors can review discussions going on within existing topics/discussion groups and participate in them. To participate in a discussion group with their own message, they have to register by keying in their user name and a password.

Tutors can also create a new topic for a discussion by choosing the option “Dodaj novo temo” (Add new topic) within an existing forum.

For example: the tutor would like to create a new topic within the existing forum “Poslovna matematika” (Business Mathematics) to be able to exchange exercises. To do so, he enters the forum “Poslovna matematika”, chooses the option “Dodaj novo temo” (Add new topic), defines a title of the topic and provides a short description of the topic, so that the other tutors can understand the purpose of the topic.

The same procedure is to be followed to create a new forum (for example for a new subject or a new discussion forum).

Implementation of the Tutors' forum

Tutors' forum became operational in June 2001. At the same time tutors received the handbook "The Role of the Tutor" with instructions for the use of the web site and the first three workshops took place. In the workshops, tutors were genuinely interested in the Forum. Since then, several forums have been created to facilitate and encourage their access.

Much to our regret however, we have realized that the forum is still not used to exchange tutors' opinions and messages. It is therefore our intention to find appropriate ways of encouraging and supporting tutors to do so. At the same time, the implementation of the Tutors' forum makes us reconsider seriously the whole organization of our distance learning study programme.

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