Experiences in and Around e-Learning

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SUMMARY

The economy of information society is based on the creation, dissemination and exploitation of knowledge. This will be one of the dominant features of the 21st century, and will play a fundamental role in generating a recovery in growth and an increase in employment. The extended use of the potential offered by information and communication technologies (ICT) will create new service markets; will speed-up administrative and decision-making procedures. Developments in the ICT have had a huge effect also on the learning environments. E-Learning represents the convergence of many factors from different fields.

e-Governance, the Knowledge Management and e-Learning intertwine. It was the main reason that Commission 2 on Professional Education, Commission 3 on Spatial Information Management and Commission 7 on Cadastre and Land Management organised a joint workshop on these topics in Budapest, Hungary. Educational needs in e-Governance, solutions and trends in knowledge management and knowledge transfer, furthermore educational and training services in e-Learning were on agenda. Speakers presented information on the present state, trends, and developments of these three current topics. The first part of the presentation is giving a concise summary of the workshop

In the second part of the paper some aspects and the importance of business models, standards and metadata are highlighted. As "e-Commerce" has challenged in the last decade basic principles about the nature of business, the impact of "e-learning" raising questions about the business aspects of education and training. Currently also fundamental issues are new technological developments on standards and open source software. These together will facilitate creativity; foster the accumulation of innovation and activity within an administration and learning environment. Metadata in education is a description of learning objects (like courses, subjects, learning materials, learning units, documents or educational services), which may contain data about their form and content. Educational metadata should provide the minimum requirements to define the attributes required to fully/adequately describe the educational objects.

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1. INTRODUCTION

E-learning can cover a spectrum of activities from ICT supported learning, through blended learning (the combination of traditional and e-Learning practices), to online learning. One of the key issues in pedagogy is individualization: adaptation the teaching to the needs of individual learners. In most cases, however, IT supported education has so far focussed mainly on transferring existing courses onto the web, just making traditional teaching even more widely available. The new web technologies

- have potential regarding the creation of more intelligent e-Learning applications, providing individualization without a prohibitive increase in man-power,
- make models of each student, i.e., a profile showing her/his background, learning needs, preferences in terms of teaching methods, and constraints.

e-Learning can be characterised by the following critical issues:

- shift from traditional education / training to flexible, individual, self-organized learning,
- move to process-oriented learning instead of product oriented learning,
- collaborative learning based on a community of learners, experts, facilitators, etc.

Human interaction is a critical component for learning. Face-to-face contact is still not comparable with virtual meeting. There are situations in which classroom training cannot be replaced. Certain content because of its nature, importance is not suitable for pure e-Learning. Blended learning is an integrated approach that applies a mix of e-Learning and traditional education or training delivery options to teach, support, and sustain the skills needed for learner's competencies. With blended learning, the tried-and-true traditional learning methods are combined with new technology to create a synergistic, dynamic learning structure that can boost learning to better results.

2. e-LEARNING EXPERIENCES

In e-Learning technology innovations have expanded from the stand-alone computer-based content to cover a range of management, delivery, and collaboration technologies. During the 1990s, networking advances, together with the rise of the Web and its supporting technologies, and the emergence of learning-management systems (see Fig. 1). Synchronous collaboration tools, which allow to share a "virtual classroom" over Internet-protocol networks. Online-learning authoring tools, collaboration tools, and systems for assessing and testing learner skills are helping in value addition. Most recently learning objects platforms are the new wave of innovation, offering the benefits of granularized learning that users can repurpose for different audiences and personalize for individual learners (Barron, 2002).

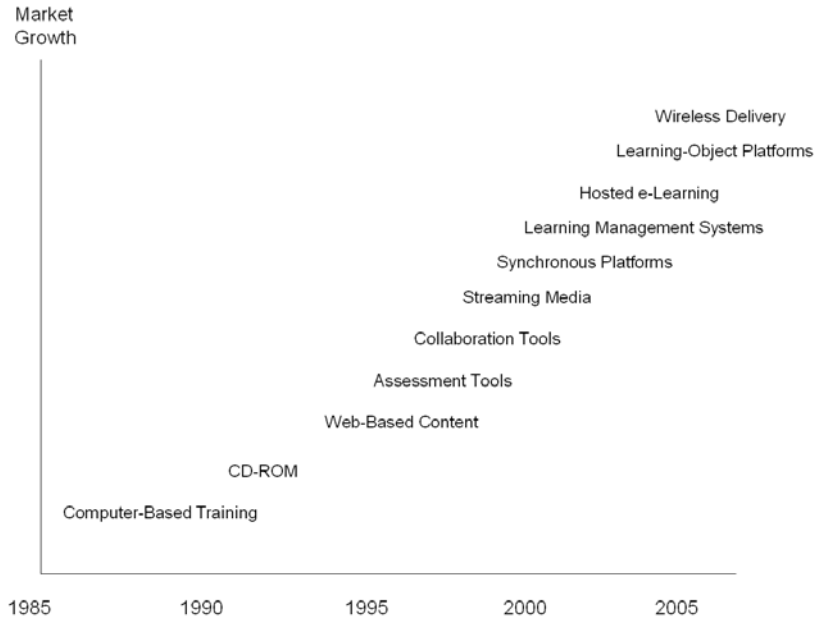

Fig. 1. Technology evolution in e-Learning (Source: SRI Consulting Business Intelligence)

Within the last decade numerous e-Learning platforms (e.g. Blackboard, Hyperwave, Ilias, Metacoon, Moodle) were developed with different concepts and supporting different operating systems. Most of them offer a wide range of functionality for the publication of documents, for promoting the interaction between lecturers and students, and for administration purposes. The systems have features, like electronic assignment submissions, virtual areas for group work, self-assessment quizzes and online testing, tracking specific student activity, poll, glossary, survey, discussion forums, and links to external web-sites (Mansberger et al, 2006).

In education the adoption of different forms of e-learning has led to radical shift in the power politics of education not only in terms of providers but also particularly at the level of the teacher-student relation. The old hierarchical structure is breaking down as globally we see shifts along a spectrum from didactic education to communities of learning (Petch, 2006).

From focusing on the local learning environment and its available educational tools, the universities are now facing a new situation, where the students just under their fingertips have access to the global pool of knowledge. Consequently, not only the role of the teacher is changing, but also the whole university organization and the principles of learning in relation to both methodology and pedagogy. The role of the universities will have to be reengineered based on this new paradigm of knowledge sharing (Enemark, 2006).

The ability of students to connect with experts around the world, as well as their group members, also opens new opportunities for learning and professional development. Students and tutors find these opportunities motivating. Distributed instruction, the explosive expansion of networks is a general trend. Whatever the revolutionary changes in technology,

the learning is the vital element. The teaching is not enough, it is the active (or pro*active*) learning which is essential (Markus, 2005).

Research into effective e-Learning indicates online communities must be build knowledge together as they work on interesting and realistic projects and problems. Unfortunately nowadays, many e-Learning companies "deliver course materials" rather than create knowledge-building communities, and stress memorization of facts, rather than having the learners actually use their new knowledge and skills as part of collaborative projects with other online learners. Most of the e-Learning products and services overlooked one fundamental factor: how people learn. The past decade has seen an explosion of research into how the people's mind works and how they learn (Markkula, 2006). The experience has shown that learning requires:

- An active role for learners, contributing content and knowledge, making connections, and building relationships for informal learning enabled by technology.
- Shift from read to write: more and more learners are contributing content and knowledge.
- Combination of pull and push: content, knowledge and connections are increasingly relevant and personal, driven by a company's and an individual's personal and/or professional needs.
- Open, unstructured content in various formats and different media (increasingly in audio and video format) and found through search.
- Involvement with realistic tasks; Interactions with peers or facilitators; Opportunities for feedback and self-evaluation.

Educators will be confronted with their changing role in e-Learning environments. While technology-based learning will unlikely able to completely replace the university education, it offers more opportunities for corporate training and continuing studies. However, the role of educators will change: they will become more and more facilitators, providing dynamic update of knowledge databases, transparent and clear syllabi, reading recommendations, etc., and offering guidance and motivation strategies for students who should get used to self-organized study approaches (Seufert, 2001).

3. KNOWLEDGE MANAGEMENT

Learning technology is rapidly changing. In the previous years we focussed at the University of West-Hungary on Content Management (CM): content creation, electronic publication, Internet-based communication and student support taking into account the special pedagogy of distance education. However, we realized the needs to move from CM to Knowledge Management (KM). The differences between CM and KM are in the business components, including strategy, processes, and organization.

By using a Knowledge Management System (KMS), organisations increase returns, save time and money, are more adaptable, and have a far better understanding of partners, processes, customers, competitors and their business. To benefit from every customer or partner interaction, corporations must give employees opportunities to record what was learned. Efficient knowledge management needs not only document knowledge, but must provide tools for collaboration among all contributors to the knowledge pool. Then, other employees

must have access to the data and the means to understand it in context. Knowledge management helps an organisation gain insight and understanding from their own experiences. When employees use this KMS, best practices are stored throughout the organization, and each employee accessing the system has similar power as the best employee.

The introduction phase of KM is the very crucial (Muggenhuber, 2006):

- KM shall be incorporated into the corporate culture.
- The advantages shall be well understood by all stakeholders.
- KM has to be actively applied.
- Required resources have to be ensured (software, training)
- Workshops and regular meetings shall support KM
- The distribution of positive experiences is essential.
- Any input shall be voluntary and not forced.
- Quality of input goes for quantity.
- Outdated information should be managed.
- Freedom of data - everybody shall be permitted to contribute.

In the knowledge society one of the important aims is to create new knowledge rather than merely to distribute or store what already exist. People's subjective interpretations are more and more important in knowledge work. Something that must be taken seriously, as a subject of research, is the way in which the human mind works. This all means the need for structural changes in education through effective visioning. In all phases of life, learners and teachers are challenged to develop and even to change their personal work methods, in all work and learning environments. Among other things, this requires the following changes in work culture (Markkula, 2006):

- Commitment will be emphasised. Theory will be converted into action compelling people to create a shared space. This “space” will shift the focus of action onto intellectual and virtual collaboration and a variety of collaboration networks.
- Action and results will be emphasised. As part of lifelong learning support, learners and teachers will create their own personal knowledge management “tool boxes”, emphasising systematic development and the results of action.
- Predicting the future will be emphasised. In lifelong learning, learners and teachers will emphasise the regeneration of knowledge. Consequently, the capacity and skills for critical knowledge processing will be understood to be the most crucial factors in learning.
- Rising to the challenges of information and knowledge will be emphasised. Learners and teachers will be able to use new learning and work methods to manage increasingly larger information and knowledge entities, and related sustaining networks.
- The basic knowledge management values – openness and trust – will be emphasised. It is only in an open atmosphere of trust that people can genuinely work and develop things together.

4. BUSINESS MODELS

As "e-Commerce" has challenged in the last decade basic principles about the nature of business, the impact of "e-learning" may raise questions to established assumptions about the provision of teaching and training. The e-Commerce literature is not consistent in the usage of the term "business model". We recommend the following definition by Timmers (2000):

- an architecture for the product, service and information flows, including a description of the various business actors and their roles,
- a description of the potential benefits for the various business actors, and
- a description of the sources of revenues.

The five C's of successful e-Learning implementation are culture, content, capability, cost, and clients (Anderson, 2002). These are the main success factors:

- Culture: In the e-Learning model students or employees can assess skill gaps and access knowledge as they need it. Learning can occur at their home, office, or any other Internet- or intranet-accessible location. But transitioning from face-to-face training to e-learning is a major cultural shift that will not carry on without the full support of senior leadership.
- Determining whether content is suitable for e-learning requires close inspection of the learning objectives. No amount of streaming video, audio files, or colourful pictures will compensate for poorly designed programs that fail to promote fundamental educational objectives.
- Capability involves the wide spectrum of computer hardware, infrastructure, IT support, and instructional design. Internal capability should support multimedia technology to fully optimise e-Learning programs. Other capabilities that need development are instructional design support and follow-up strategies.
- Cost: A key step in determining the cost of an e-learning initiative is to find out if tracking and reporting capabilities are already available or need to be developed or purchased. The creation of quality e-learning material creates a cost dilemma, since it has both high variable and high fixed costs. The reduction of the fixed costs can be achieved by reuse, rapid production, ease of updating and cost-effective pedagogy (Weller, 2004).
- Clients: Successful e-learning initiatives require strong marketing that begins long before the actual implementation date. All potential learners need to be aware of the rationale for and benefits of e-learning opportunities, and they need to be encouraged to seek out and complete programs that address their key development needs.

Recently, the traditional players, such as universities, see themselves confronted with international competitors not only from their field, but also from the hard- and software industries, which establish corporate and virtual universities. The line between academic and corporate training is blurring: many universities investing on continuing education as well and cooperate additionally with e-Learning vendors (Seufert, 2001).

An appropriate business model is a critical issue in any course delivery. New business models assure to radically change the educational services and greatly improve the effectiveness of knowledge delivery. e-Commerce also changes how we teach and learn, it is more about redesign the strategy than technology.

The funded projects very often lack a long-term business model reflecting mutual interest of the project partners. As a good, exemplary business model, developed by University of Münster and its partners, within an EC-ALFA-project emphasises the following key features (Brox, Painho et al. 2004):

- The consortium agrees on an exchange of e-learning courses on a non-fee basis.
- Each partner provides a single e-learning course, in return getting access to free courses from the partnership.
- Partners choose a course topic in which they have special expertise, which reduces development time and increases quality.
- Each course is based on an existing course and available teaching materials.
- Partners deliver a complete course including tutoring.
- The consortium uses an existing e-learning platform of one of the partners.

The business model above was successfully applied and provided feasible e-learning courses with low costs and resources. The same basic approach will be examined in another, recently started e-learning project (Brox et al, 2006; www.eduGI.net/eduGI). The business model of re-using and sharing resources could support to build sustainable courses within other networking partnerships.

5. STANDARDS

The growth of the internet, followed by the use of intranets, groupware and learning environments, has highlighted the problem of standardisation. People want to find content easily wherever it might be on the internet, and incorporate it into their courses; learners want to move between institutions taking their learning records with them; and educationalists using e-Learning systems want to have good information support from administrative systems. In fact, achieving these is key to the realisation of a global education marketplace (Cetis, 2004). Currently a fundamental issue is the emergence of two technological developments: standards and open source software. These together will facilitate creativity; foster the accumulation of innovation and activity within an administration and learning environment.

Some relevant initiatives for the standardisation of e-Learning are AICC (Aviation Industry CBT Committee), ADL (Advanced Distribution Learning Initiative, IMS (Instructional Management Systems Project), IEEE LTSC (Learning Technology Standards Committee of IEEE) and SCORM (Sharable Contend Object Reference Module).

The use of Open-Source software is rapidly growing. This can make a vital contribution to the improvement of technologies to support learning and knowledge-development. That open-source software is generally free of cost is important to many organisations, but the key advantage of open-source software for education is its open-ness. When open-source combined with open software standards, it becomes even more powerful. Open Standards allow progress towards interoperability among different systems, and towards the development of component-based solutions.

6. METADATA

Metadata in education is a description of learning objects (like courses, subjects, learning materials, learning units, documents or educational services), which may contain data about their form and content. Educational metadata should provide the minimum requirements to define the attributes required to fully/adequately describe the educational objects. The reason for creating metadata, from the provider perspective, is to improve the possibilities of retrieval as well as to support control and management of learning objects. As the volume of digital learning resources increase keeping track of, and identifying resources which is often maintained by different organisations becomes increasingly difficult. A cross domain method of describing learning resources is required. Metadata will help potential learners 'discover' what information is available and will help them assess the suitability of that data for a given task. Distance learning materials and services with their abundance of different formats and control measures might not always be usable directly by everyone: the format might be unfamiliar or unreadable, the content might be encrypted, otherwise prohibited or only permitted after payment, the resource might be large, difficult or time consuming to access etc. In all those cases, metadata could support the learning process.

7. CONCLUSIONS

To disseminate the knowledge, it is essential to have up-to-date learning materials. Thanks to the development in information technology, there have been many possibilities and tools replace and renew the traditional teaching methods. Thus the e-Learning methods are expected to play an increasing role in professional education.

For the period of 2007-2010 a Working Group will be established on e-Learning. This paper aimed to be a discussion paper on the following main objectives of WG 2.2:

- To explore the movement from traditional face-to-face teaching towards an integrated learning environment, the changing role of the academic staff.
- To discuss the technical, political, legal, organisational and cultural problems.
- To exchange experiences on content development methods and student support.
- To identify the Educational Portal functions.
- To disseminate Educational Metadata.

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BIOGRAPHICAL NOTES

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Prof. Markus has over hundred publications on various aspects of using computers in surveying, spatial information sciences and educational developments. He is actively involved in many national and international academic programmes, chairman of the National Committee of Association of Hungarian Surveyors and Cartographers, chairman of the Hungarian UNIGIS Course Board, chairman of the Agricultural Experts Committee Surveying Session at the Ministry of Agriculture.

Prof. Markus is chairing the Working Group 2.4 Knowledge Transfer in Spatial Information Management at International Federation of Surveyors (FIG), he is chair elect of FIG Commission 2 – Professional Education and member the Board of Directors of FIG Foundation. He is also member of the Executive Committee of EUROPACE (Leuven, Belgium).

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