TRENDS IN E-LEARNING

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ABSTRACT

This article is about the latest trends in e-learning. Yet, some years ago, not many people have heard of the term "e-learning". A lot of people have heard of terms such as distance education or distance learning, yet with the introduction of e-learning, distance education took on a whole new meaning. With e-learning, the possibilities for getting knowledge and information out to the learner at her/his own pace opened a whole new world for knowledge transfer. In recent years terminology changed and it went from using such terms as "technology-supported learning, distance learning and distance education" to "online learning and web-based training" to "e-learning". Today, e-learning allows us to share and manage knowledge and skills of the professionals who work in our colleges and universities, and to get the right information to the right people, when and how they need it.

1. TRENDS IN E-LEARNING TECHNOLOGIES

1.1 Mobile technologies

In the future learning solutions and services will be integrated into mobile technologies as mobile phones, PDAs, digital pen and paper, and in the long term, mobile devices that are not yet on the market. In the long term, learning solutions and services are also likely to be integrated into electronic appliances, machines and information interfaces.

For mobile learning there are two distinct potential markets which are evolving:

a. The first one is the market of learning services for people that are without infrastructure (accessibility to internet and e-learning may not be as wide spread in rural or remote areas) and learners in developing economies

b. The second one is the market of learning services for people who's jobs require them to continuously move, people learning and receiving information while visiting various sites and locations, certain types students needing individualized learning education, on the move and while on external projects.

In the United States the PDAs have already been used in schools and for workers on the move and this thing had significant results in terms of improved learning effectiveness. In Europe, mobile learning is beginning to develop, and telecommunications companies such as Nokia and Vodafone have already integrated these technologies into their training and development systems.

However, the real growth across this sector remains to be seen. Any growth in this market is likely to happen in the medium to long term.

1.2 Simulations in e-learning process

For a number of years, simulations have played an important role in the training activities of certain sectors, like the defense, aviation and aeronautical industries in several countries. They were not adopted until now on a large scale as learning tools due to some factors like the cost of development and the lack of tools for developing high-quality simulations. These days we are in a different situation and simulations are being adopted in other industries and for a broad range of skills and competence development. Technology and cost barriers are

continuing to shrink, opening up the potential for wider adoption of simulation technology.

Today, computer technologies, such as Macromedia Flash, have become ubiquitous and e-learning vendors with simulation-development expertise are trying to offer more industry- and topic-specific simulation templates.

There are still barriers to be overcome, particularly in terms of design innovation, but computed mediated simulations are expected to gain a larger share of education and training activities. Simulations may offer advantages over handbooks and they can complement lectures, demonstrations and real world practice opportunities.

The market for these kind of learning services will probably continue to grow as simulation technologies become more sophisticated and more cost effective to build.

1.3 Adaptive learning environments (ALEs)

In the recent years there is an increasingly heightened awareness of the potential benefits of adaptivity in e-Learning. This is happening because the ideal of individualized learning (i.e., learning suited to the specific requirements and preferences of the individual) cannot be achieved, especially at a "massive" scale, using traditional approaches. Factors that further contribute in this direction include: the diversity in the "target" population participating in learning activities (intensified by the gradual attainment of life-long learning practices); the diversity in the access media and modalities that one can effectively utilize today in order to access, manipulate, or collaborate on, educational content or learning activities, alongside with a diversity in the context of use of such technologies.

A learning environment is considered adaptive if it is capable of: monitoring the activities of its users; interpreting these on the basis of domain-specific models; inferring user requirements and preferences out of the interpreted activities, appropriately representing these in associated models; and, finally, acting upon the available knowledge on its users and the subject matter at hand, to dynamically facilitate the learning process.

Adaptive behavior on the part of a learning environment can have several manifestations:

- Adaptive Interaction which refers to adaptations that take place at the system's interface and are intended to facilitate or support the user's interaction with the system, without, however, modifying in any way the learning "content" itself. Examples of adaptations at this level include: the employment of alternative graphical or color schemes, font sizes, etc., to accommodate user preferences, requirements or (dis-) abilities at the lexical (or physical) level of interaction; the reorganization or restructuring of interactive tasks at the syntactic level of interaction; or the adoption of alternative interaction meta phors at the semantic level of interaction.
- Adaptive Course Delivery which constitutes the most common and widely used collection of adaptation techniques applied in learning environments today. In particular, the term is used to refer to adaptations that are intended to tailor a course (or, in some cases, a series of courses) to the individual learner. The intention is to optimize the "fit" between course contents and user characteristics / requirements, so that the "optimal" learning result is obtained, while, in concert, the time and interactions expended on a course are brought to a "minimum".
- Content Discovery and Assembly refers to the application of adaptive techniques in the discovery and assembly of learning material / "content" from potentially distributed sources/ repositories. The adaptive component of this process lies with the utilization of adaptation-oriented models and knowledge about users typically derived from monitoring, both of which are not available to non-adaptive systems that engage in the same process.
- Adaptive Collaboration Support is intended to capture adaptive support in learning processes that involve communication between multiple persons (and, therefore, social interaction), and, potentially, collaboration towards common objectives. This is an important dimension to be considered as we are moving away from "isolationist" approaches

to learning, which are at odds with what modern learning theory increasingly emphasizes: the importance of collaboration, cooperative learning, communities of learners, social nego tiation, and apprenticeship in learning.

One of the problems regarding the adaptive learning environments now is that existing standards do have some provisions for adaptation, but require substantial extensions to accommodate common practice in ALEs. The motivation for seeking standardization in adaptive e-Learning is directly linked to cost factors related to the development of ALEs and adaptive courses.

1.4 Open source e-learning tools

Today it is estimated that there are already more than 250 providers of commercial Learning Management Systems. In addition, there were recently identified more than 40 open source LMS offerings (some of the most well known are Moodle, ILIAS, eduplone, Claroline and SAKAI).

Most of these products have extensive developer communities and present strong arguments for considering open source applications like an alternative to commercial products. Some of the criteria that are in favor of making a decision regarding an Open Source software applications are related to cost savings, stability, performance and access to code. On the other hand, for ensuring that users in the near future as well as the longer term have access to the best available applications, these Open Source software applications should be built on open standards.

It remains to be seen if open source e-learning technologies will capture the current or future market share from commercial providers, but the important thing in the process of making a decision regarding the adoption of a certain e-learning software for education is to consider all software options and make a choice based on their merits.

1.5 Standards development

Standard development is meant to knit together disparate groups and interests in the distributed learning community. It is intended to coordinate emerging technologies and capabilities with commercial/public implementations.

Until some time ago, a number of organizations have been working on different but closely related aspects of e-learning technology. These organizations have made great strides in their separate domains, but they have not been well connected to one another. Some of their specifications are general, anticipating a wide variety of implementations by various user communities (e.g., those using the Web, CD-ROMs, interactive multimedia instruction or other means to deliver instruction) and others are rooted in earlier practices and require adaptation to newly emerging approaches.

The idea is now to build a common "reference model" for the foundation of a good Web-based learning. It is generally accepted that all systems, whether commercial or open source, should be built on open standards if the market is to develop. These standards should articulate guidelines that can be understood and implemented by developers of learning content. In the second place, they must be adopted, understood and used by as wide a variety of stakeholders as possible, especially learning content and tool developers and their customers. Thirdly, they must permit mapping of any stakeholder's specific model for instructional systems design and development into itself. Stakeholders must be able to see how their own model of instructional design is reflected by the reference model they hold in common.

In order to stimulate industry agreement some high-level requirements are established for the development of the e-learning environments. The requirements are:

- Accessibility: the ability to locate and access instructional components from one remote location and deliver them to many other locations.
- Adaptability: the ability to tailor instruction to individual and organizational needs.
- Affordability: the ability to increase efficiency and productivity by reducing the time and costs involved in delivering instruction.
- Durability: the ability to withstand technology evolution and changes without costly redesign, reconfiguration or recoding.

- Interoperability: the ability to take instructional components developed in one location with one set of tools or platform and use them in another location with a different set of tools or platform.
- Reusability: the flexibility to incorporate instructional components in multiple applications and contexts.

Probably standards and specifications (such as IEEE LOM, SCORM and more recently IMS specifications such as IMS LD, IMS LIP and IMS QTI) will successfully evolve and become flexible enough to allow for the integration of real time learning processes, simulations, games, customized adaptive learning, digital rights management by 2010.

2. SOME OTHER TRENDS IN E-LEARNING

2.1 Trends in the development of e-learning markets

Some of the main evolution features in the e-learning markets are presented in the following table:

Sector	Trends
Schools	- Although many schools have introduced platforms for sharing information and supporting the pupils in their learning, it is likely to take years before the teaching staff and culture is ready to adopt comprehensively pedagogical approaches that take full advantage of e-learning. -In the medium term, learning material publishers will continue to introduce text-based curricula resources supplemented by e-learning elements, but these will typically require access to different external platforms and will be linked directly to specific textbooks. - On the platform side, if in-house developments and the open source tools succeed in overcoming problems of reliability, interoperability, documentation, continuous development and standards integration, commercial offerings will have a very tough time trying to achieve market shares in the school market. - As teachers become more ICT literate, they will be developing more of their own learning materials and sharing these with each other and pupils, making these suitable to individual learners.
Higher Education	- Open Source e-learning platforms are likely to gain a foothold in this sector. - The universities will increase in the number of courses offered in e-learning format (as stated in the study "Virtual Models of European Universities", European Commission 2004).
Vocational Education and Training (VET)	Open source e-learning platforms will offer a serious competitive alternative for users in the VET market and this is based on the fact that there is already a solid base of in-house developed learning platforms at VET institutions.
Workplace Learning	- Strong e-learning sectors in the workplace market will continue to be the ICT, business services, financial and pharmaceutical sectors. In the public sector, it will continue to be the national health services, the defence departments and public including local government authori ties.

	- In this sector, apart from internal education and training for employees, there is likely to be more focus on training through e-learning to external partners and customers.
Consumer market	- The consumer e-learning segment will consist of Internet and CD-ROM based edutainment products primarily for children and young people and in the long term, also mobile, location independent edutainment to handheld devices. It will also include standard and individualized language learning products for the same media, and educational products that allow parents to supplement their children's education with online or CD-ROM based learning opportunities. - In future, more and more guidelines and manuals associated with complex domestic appliances and small machines will be multimedia based with simulations of the assembly process, maintenance, cleaning and/or usage. It will be possible to access the simulations from various devices (PDA, Mobile phone, TV connected to Internet or a PC).
Lifelong learning	- Although it is an obvious market for e-learning products and services, it is unlikely to show much growth in the future because the motivation of learners to choose lifelong learning via e-learning is limited unless it is part of a formal postgraduate education financed by employers or required education in order to change or advance in careers while still in employment.

2.2 Future development in the sector of e-learning suppliers

The evolution of e-learning supplies can be characterized as follows:

a) Many small e-learning operators in all product areas (technology, service and content) will have disappeared, merged with others (both international and national) or evolved into a different sub sector. Those that survive will have identified a valuable niche or built strong ties to a loyal customer base.

b) New operators could emerge either in niche areas (game based learning, simulations, open source integration) or by complementing their current offerings with e-learning services. In the future telecommunications operators and professional associations are expected to enter the market as suppliers of e-learning services for their customers.

c) The international (predominantly US and Canada-based) e-learning operators can be expected to continue their strong market presence and in some areas they will increase their dominance. Firms offering L(C)MS and enterprise suites include companies like IBM, Oracle, SAP, SumTotal and SABA, all mainly addressing the needs of large o rganizations. Within education segments, they will include companies like WebCT, Blackboard and Microsoft. Within live e-learning platforms, they will include Centra, Interwise and Webex.

d) Strong international entrants can also be expected within emerging segments such as game based learning. US-based operators like Horn Interactive, Digital Mill, Socratic Arts, Breakaway Games, ACLS Interactive could be tempted to enter the European markets.

2.3 Blended learning

Another trend in our days involves blended learning programs. The term "blended learning" has come to describe a well thought-out combination of e-learning and other traditional training methods. The combination that we speak about is meant to increase effectiveness in the process of learning, due to the fact that a single delivery method is no longer sufficient to handle all training needs. Blended learning has the advantage

that preserves the necessary consideration of how people learn, but in the same time offers options for learning and produce measurable savings in learning offerings promised by e-learning.

3. CONCLUSIONS

The principal aim of this paper was to provide a summary of current trends in the development of e-learning.

Unquestionably, e-learning will continue to grow in our organizations. In anticipation of this growth, the governments, business companies and professional associations can start focusing on applications and the effective and efficient implementation of e-learning. By recognizing that e-learning truly is a methodology, one can experience the greatest benefits that e-learning has to offer now and in the future.

In the end, the fact remains that, with respect to e-learning, poor quality procurement practices (in all sectors but especially in the public sector) are a barrier to growth and adoption. So it is necessary to make a thorough evaluation when it comes to choose an e-learning software for education in order to improve the knowledge of learners, the learning outcomes, the performance outcomes, the business and policy impact and in order to value the money spent.

REFERENCES

[1]. Kerry Blinco, Jon Mason, Neil McLean, Scott Wilson – "Trends and Issues in E-learning Infrastructure Development", July 2004

[2]. Joe Pulichino - "Current Trends in e-Learning" - Research Report, March 2005

[3]. Alexandros Paramythis and Susanne Loidl-Reisinger – "Adaptive Learning Environments and e-Learning Standards"

[4]. Mark W. Brodsky – "E-Learning Trends Today and Beyond", May 2003

[5]. Consuelo L. Waight, Pedro A. Willging, Tim L. Wentling – "Recurrent Themes in E-Learning: A Meta-Analysis of Major E-Learning Reports"

[6]. Jane Massy – "Study of the e-learning suppliers' "market" in Europe"

[7]. Advanced Distributed Learning (ADL), Sharable Content Object Reference Model (SCORM®) 2004 2nd Edition Overview, 2004.