

E-Learning Based Future Education

***Arvind Kumar Gautam**

****Ajay Kumar Patel**

Introduction

E-Learning Based Future Education (ELBFE) is currently a hot research and development area. Benefits of E-Learning based education are clear: classroom independence and platform independence. Web courseware installed and supported in one place can be used by thousands of learners all over the world that are equipped with any kind of Internet-connected computer. Thousands of Web-based courses and other educational applications have been made available on the Web within the last five years. The problem is that most of them are nothing more than a network of static hypertext pages.

A challenging research goal is the development of advanced E-Learning based educational applications that can offer some amount of adaptively and intelligence. These features are important for ELBFE applications since distance students usually work on their own. An intelligent and personalized assistance that a teacher or a peer student can provide in a normal classroom situation is not easy to get. In addition, being adaptive is important for ELBFE courseware because it has to be used by a much wider variety of students than any "standalone" educational application. A Web courseware that is designed with a

* Asst. Professor, Department of Computer Science, Indira Gandhi National Tribal University, Amarkantak-484886 India

** Asst. Professor, Department of Computer Science, Indira Gandhi National Tribal University, Amarkantak-484886 India

particular class of users in mind may not suit other users. Since the early days of the Web, a number of research teams have implemented different kinds of adaptive and intelligent systems for on-site and distance ELBFE.

Information Systems is widely and deeply integrated into peoples' lives. Continued rapid growth in the capability of computer and communications technology and the software that gives it functionality will have ensured that computation will be part of most daily activities, radically affecting many occupations, changing the world of play and entertainment, stimulating major paradigm shifts in the arts and sciences, fundamentally altering how we view ourselves in relationship to the world. The trends are already obvious. E-learning is so central to most human activities; ELBFE research will increasingly tackle a wider and wider range of problems affecting every aspect of life. ELBFE unique concerns with deep computational models of E-learning will also be advantageous when such deep modeling will be necessary to achieve the functionality required of E-learning. Universality of information technology will affect the spread of knowledge through society, and, correspondingly, the role of E-learning¹.

E-Learning Education: An Overview

The delivery of a learning, training or education program by electronic means is called E-Learning. E-learning provides the potential to provide the right information to the right people at the right times and places using the right medium. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material. E-learning is delivered to the end-user via a computer using standard internet technologies. E-learning focuses on the broadest view of learning: learning solutions going beyond the traditional paradigms of training.

E-learning can involve a greater variety of equipment than online training or education, for as the name implies, "online" involves using the Internet or an Intranet. CD-ROM and DVD can be used to provide learning materials². Distance education provided the base for E-Learning's development. E-learning can be "on demand". It overcomes timing, attendance and travel difficulties. E-learning comprises all forms of electronically supported learning and teaching. The Information and communication systems, whether networked or not, serve as specific media to implement the learning process. The term will still most likely be utilized to reference out-of-classroom and in-classroom educational experiences via technology, even as advances continue in regard to devices and curriculum.

E-learning is essentially the computer and network-enabled transfer of skills and knowledge. E-learning applications and processes include Web-based learning, computer-based learning, virtual classroom opportunities and digital collaboration. Content is delivered via the Internet, intranet/extranet, audio or video tape, satellite TV, and CD-ROM. It can be self-paced or instructor-led and includes media in the form of text, image, animation, streaming video and audio. Abbreviations like CBT (Computer-Based Training), IBT (Internet-Based Training) or WBT (Web-Based Training) have been used as synonyms to E-Learning.

Related Terms of E-learning

E-learning is not the only term used when referring to 'learning using the internet'. Related terms are sometimes broader in their meaning, sometimes not.

Online learning

Online learning is defined as broadly as possible by giving the following description: Online learning refers to learning and other supportive resources that are available through a computer.

Web-based training

In the term web-based training, there is already the restriction of the 'web'; which plays a more dominant role when offering the training. Web-based training is commonly described as a form of computer-based training, referring to courses on the intranet, extranet or Internet and that are linked to learning resources outside the course, such as references, electronic mail and discussions and video conferencing. For the term internet-based training a matching description is found in various sources.

Technology based training is again a term with a very broad meaning. A common description of the term is the following: technology based training refers to any training through media other than the classroom. This includes computers, but it also refers to television, audio, tape and print.

Computer based training or instruction

The last term in our list is computer based training or instruction, which is defined as presenting courses on a computer. The computer does not provide links to learning resources outside the course. Often, the computer is not connected to a network. Here, we notice a built in restriction. Various sources stress the fact that the course taken is not connected to any network. The user will only be able to be instructed about the available course and is not able to explore information related to the courses via links or define the learning speed to his or her will.

Proposed Framework for E-Learning Based Education -

We live in a society increasingly fuelled by information. By 2025, almost all of the world's information will be accessible through information technology. This information will include processes, text, video, other media, sensory data, in short any information gathered or used by or for society. This vast sea of information will be partitioned

into a horde of web sites and other local caches. In effect, the world of 2025 will be a *billion* channel universes, far exceeding the “mere” 200 channels discussed in many of today’s analyses³. Of course, our real lives will still go on, with matters of nutrition, affection, family, work, religion, recreation, etc., absolutely central to us, as now. However, even in these matters, information technology is increasingly involved. By 2025, it will be deeply embedded in resolving any information need, personal, social, or commercial.

The IT village for E-Learning

When the entire world’s information will be accessible through information technology and villages will interconnected with each other through IT then it will called IT Village. Like any real village of our India, this IT village will constrain a person’s perspectives, giving them only a fragmentary and partial view of the wider world outside the village. In marked contrast to the predicted global village of the television era to be shared by everyone, this particular village in cyberspace will be definitively local. Within his or her IT village a person will access different information and contact different people in order to fulfill different needs. If they want to prepare for an exam in their software engineering course, they will get in touch with their course study group. These other people will be viewed by the person as playing certain roles, achieving certain functions, just as in a real village.

New people can move into the village, current neighbors can move out, people can leave the village and return with new perspectives, outside information can filter in through e-mail and other means. The person can add friends to their village, stop interacting with others, look more widely into cyberspace or talk to friends who have done so, receive e-mail or other electronic contact from afar, etc. As we know the flow of information may be governed

by the speed of light, the flow of knowledge will be governed by the speed of human to human interaction⁴. This will be one the keys to learning and teaching in 2025.

Virtual communities for E-Learning

Within their village a person will be a member of many *virtual communities* that extend far beyond the boundaries of their village. The other people in their village, i.e. the person's neighbors, will also variously be members of some of these same communities. However, the person won't personally know most members of these communities. Moreover, he or she will not be a member of most communities in cyberspace. Some of these communities will be implicit, emerging as informal patterns of interaction on the internet and connectivity on the web. Membership in a virtual community will be fluid, with members coming and going with ease. While each community will be geographically distributed, it will be conceptually focused around a few issues.

The importance of E-learning will vary from community to community. Some of these communities will be explicitly educational, defined in terms of traditional E-learning goals and structures, such as the community consisting of the students taking Some communities may be non-educational in goals, but have a E-learning component, such as the Society of Professional Engineers, where it is important to learn many facets of Engineering practice through "apprenticeship" to senior members of the community.

Each community will have its own terminology, its own shared assumptions, its own important issues, in short its own language and culture. The linguistic and cultural distinctness of each community will be the second major key to learning and teaching in 2025⁵. In effect, virtual communities will structure the flow of knowledge

through cyberspace, and thus will be critical to how learning happens. The following pattern should be common: relatively quick dissemination of knowledge within a community, relatively slow dissemination between communities. This is because people in a community speak the same language, share the same cultural assumptions, and frequently interact with one another. Once a few of them have understood something new, they can act as mentors and teachers in helping the others in the same community to understand it, a process that can happen fairly quickly because the new knowledge has already been translated appropriately for the rest of the community. So we can set up two kinds of E-learning:

- (i) E-learning between communities
- (ii) E-learning within a community.

E-Learning between virtual communities

The fragmentation of cyberspace into communities will stimulate the need for E-learning to happen between communities, for knowledge to spread from one community to another. There will be straightforward fact-based knowledge to be disseminated, for example letting various scientific communities know about a new government policy on research funding developed in bureaucratic communities. But, there will also be much deeper kinds of knowledge that must be shared, for example fostering the spread of new computational modeling ideas from the knowledge representation research community to the commercial software vendor community or to the database research community.

The technology built to support E-learning between communities will have several roles. One role will be to encourage the movement of relevant knowledge from community to community. To some degree this will happen naturally, via the spread of ideas through people whose

electronic villages overlap more than one community and who take the time to transform information from one community so it is understandable to one or more of the other communities in their IT village. Future recommender systems may well be much more proactive, acting independently of a user's specific request, and seeking much more complex kinds of knowledge, often from communities far removed from those of which the user is a member⁶.

Sometimes the technology itself will be able to spread the knowledge directly, for example having the recommender system post fact-based information to the user. But, for more complex knowledge, people may be needed to help the user to interpret the new knowledge. When the knowledge is found from a community of which the user is a member, this process will be quite easy since the user can usually be put in touch with another person from his or her own village who is also a member of the same community.

E-Learning within a virtual community

Learning will also happen within communities. The user who has just learned something new may wish to communicate it to others in their own community. Unlike the "diplomats" who negotiate mutual understanding between communities, the collaboration here is more like a coach or a tutor interacting with students, although the "teaching" methods may be very different from traditional classroom techniques. Apprenticeship styles of teaching and learning would frequently be appropriate, where the persons bringing the knowledge to the community will act as guides to other members of the community who need to know the information. Again, there can be support tools for this, some of them similar to the tools supporting collaboration between communities, and some different, recognizing the different relative status of the collaborators in a community to community communication and the collaborators within a community. In particular,

tools to support cognitive apprenticeship. Another kind of E-learning within a community will be through internal debate, leading to new knowledge and insights. This will be achieved both through relatively free form intercommunity discussion, and also "top down" through community "elders" sharing their insights with others in the community. Technology electronic forums, presumably extended to proactively engage individuals in discussion, will be crucial for fostering internal E-learning within the community.

Another kind of E-learning within a community involves initiating into the community newcomers who want to become members of a community. What it takes to learn to be a member of a community will depend on the nature of the community.

E-Learning systems to support community immersion will have to reflect the alternative reality of the community, to use the language and terms of the community, to be embedded in interaction and pedagogical strategies that take into account the cultural assumptions of the community⁷. So, **ELBFE** will play an important role in designing support systems for community immersion.

Learning and Teaching in ELBFE

In the world of 2025, people will live in their own protected IT village, culture will be partitioned into virtual communities, learning and teaching will be correspondingly localized and contextualized by community culture, and information technologies will be fragmented and definable only relative to end use. **ELBFE** will be an empirical science in 2025, even more so than today. The heart of the field will be building real systems for real use. Appropriate virtual communities will provide sets of ready made test subjects for experimenting with these systems. Learning support technology will have to be situated in the specific culture of each such community of test subjects to succeed,

but if it succeeds in these communities it should be possible to adapt it to other communities.

E- Learning increasingly is on-line, contextualized by community culture, and integrated with other aspects of community life. In such an environment, there will be many opportunities for *just in time learning* of relatively small chunks of knowledge in the context of use. So, E-learning also becomes fragmented⁸. As is increasingly the case even today, manuals and textbooks will be thrown away, and learning will proceed incrementally while real world goals are being accomplished. Such E-learning will be better integrated with the learner's broader goals, and should be perceived to be more directly relevant to a learner. Learning and life start to merge, and the technologies to support learning start to merge with those deployed to support other activities in life. Already new E-learning technology fields are forming based on this trend, such as Computer Supported Collaborative Learning which has spun off from the field of Computer Supported Collaborative Work. Although some learning will happen exclusively through the mediation of information technology, very often there will be a need for humans to help out, to take on the role of teacher or collaborator.

Advantages of E-learning

- Flexibility, accessibility, convenience: Users are able to proceed through a program at their own pace and at their own pace. Users can access an e-learning course anytime, anywhere, and learn only as much as they need.
- Cross-platform: E-learning can be accessed by Web browsing software on any platform. A training program can be delivered to any machine over the internet or intranet without having to author a program for each platform.

- Browser software and internet are widely available: Most computers have access to a browser, are connected to the organization's intranet or the internet.
- Inexpensive worldwide distribution: There is no need for a separate distribution mechanism.
- Ease of updating information: if changes need to be made to a program or courseware after the first implementation, these changes are made on the servers storing the program or courseware. Everyone worldwide can instantly access the update of information.
- Travel costs and time savings: there are no travel costs for bringing remote employees to a centralized workshop.
- Training efficiency is increasing significantly. Not only from a qualitative standpoint (i.e. pedagogical by the use of a new method, personalization, learner autonomy, memorization and follow-up, operational by learning by opportunity and the speed of the learning updates, and organizational by creation of knowledge sharing community) but also from a quantitative standpoint (i.e. learning elapse decreases, learning cost may be reduced and learning effectiveness is increasing).

Conclusion

It should be clear to anyone who is familiar with the needs of E-Learning based education, that adaptive and intelligent technologies can enhance different sides of E-learning based educational systems. Model matching technologies can enforce both administration of distance courses and communication / collaboration between students and teachers. From another side, adaptive and intelligent technologies have not found yet their place in "real" virtual classroom, i.e., as a part of real courseware used by hundreds of distance students.

ELBFE research, like many other fields, is cyclic, with issues and techniques being developed, explored, exploited, and discarded, only to be resurrected a few years later in a different form as forces in the outside world make them relevant again. Ideally, the cycle is actually a spiral towards increasing sophistication in the issues and techniques. Similarly, the perceived relevance of a field waxes and wanes, as its issues seem to be relevant or irrelevant in the outside world. By 2025, the changes in culture, learning, teaching, and technology discussed in this paper, will once again make the goals of ELBFE highly relevant to the world. E-Learning will be deeply embedded in the electronically enhanced cultures of the day, and will merge with work and life.

The ELBFE research agenda will also be highly relevant. ELBFE brings so many important issues together into a single place, and then so starkly illuminates them, that ELBFE researchers cannot avoid working on the hard "real" problems facing technology that is to be used in the real world. The ELBFE field is thus ideally situated to influence and contribute not only to learning technology, but also to other fields in computer science and even disciplines such as education, psychology, anthropology, and sociology. These disciplines, in turn, should be able to feed back ideas, techniques, and information to ELBFE, especially as they increasingly subscribe to aspects of the computational paradigm. As long as the competition on the market of E-Learning based educational system will increase, "being adaptive" or "being intelligent" will become an important factor for winning the customers.

References

1. Andriessen, J. and Sandberg, J. (1999). Where is education heading and how about AI?
International Journal of Artificial Intelligence in Education.

2. Akhras, F.N. and Self, J.A. (1996). A process-sensitive learning environment architecture. *Proceedings of the Third Intelligent Tutoring Systems Conference*, Montreal. Anderson, J. R. (1983).
3. Ibid
4. Baker, M. (1994). A model for negotiation in teaching-learning dialogues. *Journal of Artificial Intelligence in Education*.
5. Ibid
6. Ibid
7. Ibid
8. Hoppe, H.-U. (1995). The use of multiple student modeling to parameterize group learning. *Proceedings of the Seventh International Conference on Artificial Intelligence in Education*, Washington.

References

1. Anderson, J. and Sandberg, J. (1999). Where is education heading and how about AI? *International Journal of Artificial Intelligence in Education*