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An Evaluation of Web-Based Education: Leading Trends Towards E-learning and It's Effects

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Abstract

Web-based education is a technology that plays an important role in modern education and training. Its great importance lies in the fact that it makes learning content readily available at any place at any time. Until recently, many educational journals have debated the issue of the "virtual university" as one of application areas of web-based education. As technology is improving and evolving, such "virtuality" becomes a reality. The forecasts are that, in the not too distant future, it will be possible for courses to be completed solely by the use of the World Wide Web or Internet. The main contention of this paper is that technology undoubtedly will offer many benefits for the learner, however, the pitfalls need careful consideration in adoption of Web-based education at various levels of study.

Keywords: E-learning, Computer-assisted instruction, Virtual university, E-education, Web-based Education.

1. Introduction

The use of web-based instruction is increasingly common in many disciplines in higher education. Reserve materials are available on-line from libraries, class discussions are held via e-mail, textbook publishers provide WWW sites for their products, etc.; software developers are making programs available to colleges and universities that allow for on-line interactive instruction and testing. Although these materials are generally used as supplements in traditional lecture hall settings, they also serve as a substitute for class meetings in the rapidly growing area of distance education. Little is known about the effectiveness of these web-based supplements to face-to-face instruction. How intensively will students utilize on-line course materials? Does access to on-line course materials increase comprehension and retention? Despite the paucity of answers to these and similar questions, the rush to make on-line technology an important component of higher education continues. The focus of this paper is virtual education in context of Web-based distance education. We analyze what kind of technologies are available right now, how easy they can be implemented on the Web, what is the place of these technologies in large-scale Web-based education and what ethical considerations must be adopted.

2. Web-based education

Web-based education (WBE) is currently a hot research and development area. Benefits of Web-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

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development of advanced Web-based educational applications that can offer some amount of adaptivity and intelligence. These features are important for WBE applications since distance students usually work on their own (often from home). 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 Web-based 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 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 WBE. The goal of this paper is to provide a brief review of the work performed so far in his area. The paper is centered on different adaptive and intelligent technologies. We stay on the level of technologies to provide compatibility with earlier papers on adaptive hypermedia [1] and Web-based ITS [2] By adaptive and intelligent technologies we mean essentially different ways to add adaptive or intelligent functionality to an educational system. A technology usually could be further dissected into finer grain techniques and methods, which corresponds to different variations of this functionality and different ways of its implementation. In the next section we analyze what kinds of technologies are available right now, and how easy they can be implemented on the Web.

2.2 Web-based Education System: Trends in E-Learning Technologies.

In this section the major technologies that relate to E-learning are being described. The purpose of these descriptions is to provide a basic understanding of each technology and demonstrate its contribution to the advancement of web-based education system.

2.2.1 Learning Objects.

E-learning is currently implemented in most of the higher education institutions around the world. Some of the most well known E-learning platforms include *BlackBoard* and *WebCT*. Other similar systems exist that are used not only by academic institutions but other industries as well. Their purpose is to facilitate capturing, editing and distribution of knowledge in a well-structured and suitable way. Such systems include: *Course Keeper*, *Multibook*, *Atutor* and more. A list of such systems is provided by the IMS Global Learning Consortium Inc. [3], an organisation that deals with specifications for interoperable learning technologies. More systems can also be found through the e-learning center (http://www.e-learningcentre.co.uk). Up until recently most of the e-learning systems tended to facilitate the distribution of structured online courses [4,5,6,7]. Quite often this distribution was achieved by supplying links to courses through web portals. "The instructional content and the structure of these courses don't provide the learning experience suited to each student individually. It is difficult for many students to follow a long continuous course that doesn't allow him to find the exact chunk of material he wants in order to solve a specific problem" [8]. In order to counteract these problems, the technology of learning objects LOs has been developed. The term 'learning object' was originally coined by Wayne Hodgins in (1994). The definition of a LO is still rather vague, as different organisations view LOs differently in terms of "size, terminology and focus" [9,10]. The Institute of Electrical and Electronic Engineers IEEE, for example, defines a learning object as: "any entity, digital or non digital, which can be used, reused or referenced during technology-supported learning" [11]. According to Longmire the object approach can satisfy both immediate learning needs...and current and future learning needs that are no course-based". Longmire also mentions a number of arguments supporting the creation of content as LOs, including: Flexibility, Ease of update, Search and content management, Customization, Interoperability and more. Apparently LOs are commonly accepted as the technology dominating current and future E-learning developments. A closer examination of contemporary research and development reveals that there are a variety of technologies and trends that are often linked to LOs and they form the main pool of research efforts in the area of E-learning.

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2.2.2 Metadata

One of the most important attributes of a LO is its metadata. Metadata can be defined as "the means to fully describe and identify every piece of E-Learning content so that you can efficiently find, select, retrieve, combine, use/re-use, and target it for appropriate use" [12]. According to a MASIE Center report [12] metadata are used in E-Learning for the following purposes:

· Categorization: To organize LOs into categories.

· Taxonomies: The organization of categories into ordered-groups of relationships (e.g. hierarchical structures)

· Re-use: The reusability of learning content increases as the content becomes smaller and its metadata more structured.

· Dynamic assemblies: The metadata can be used to enable the dynamic assembly of LOs.

2.2.3 Wireless delivery and Mobile systems

IEEE refers to the term M-Education as a new conceptual paradigm in the use of mobile and wireless technologies for education.

2.2.4 Web Services

Web-services are "Web-based applications that dynamically interact with other Web applications using open standards that include XML, UDDI and SOAP" [13].

Writers [14] argue that Web Services are capable for implementing an interoperable E-Learning system for three main reasons:

· Information exchanged between E-Learning systems all has XML bindings;

· Web Services are platform and language independent;

· As Web Services can be used through the same model over private intranet or public internet, then the network technology need not affect the E-Learning developer and consumer.

3. Challenges issues of distance Web-Based learning technologies

Several advantages make distance learning become popular and important. Convenience and flexibility are some of the main reasons. With the growing number of Internet users, Web-based distance learning programs enable lifelong education anytime at any location. Scalability of participants is another advantage. With a proper support of network infrastructures and computer systems, a large number of students can join distance-learning programs together. Moreover, timely update of course contents and on-line discussion also affects the decision of a policy, which affects the end user again. Therefore, policy, technology, and people are strongly related in the life-cycle of distance give students the benefit of acquiring firsthand information, which is precisely presented by using computer software. Some of key areas of web-based learning more and more web education systems are available today, but many of them have limitations that hinder improvement of the effectiveness and societal potential of E-Learning. Some of these problems are:

• Text-based learning materials

Many E-Learning systems present only text-based content, which may seem boring to learners and cause them to disengage during online learning. Learners may be reluctant to read large volumes of text on screen. A multimedia-integrated systems allows learners to take advantage of multiple human senses and tap into their feelings and emotions.

• Lack of rich content for good understanding

A number of relearning systems lack adequate instructions for students. Some systems provide only PowerPoint slides, which may not ensure that learners understand the learning content. It is not uncommon for readers of slides to fail to understand what an instructor really means by all those bullet points.

•Insufficient interactivity or flexibility Unlike traditional classroom learning, in which students interact directly with instructors at the same time

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and location, an important issue is that studying online requires students to be more actively engaged. Many current E-Learning systems are not quite interactive. Learners have little flexibility to adapt learning content and process to meet their individual needs. For example, it may not be possible to find exactly what is wanted or to skip a portion of content that is already known. Consequently, E-Learning is less likely to hold learners. In other cases, a student may want to ask a question and get an answer right away instead of sequentially going through an entire instructional video or other multimedia content to find an answer. So far, most multimedia-based E-Learning systems do not provide this capability.

- Unstructured and isolated multimedia instructions.

In recent years, multimedia technology has advanced remarkably and has potential for influencing both processes and products of E-Learning. However, many multimedia-based E-Learning systems simply post content on the Web, without any processing. Postings are usually static, passive, and unstructured, without any indication of close associations among relevant materials in different media. For example, instructional videos and PowerPoint slides of the same lecture are presented separately. E-learners may even have to go to two different Web sites to view both of them.

4. Shaping the future

Forces that are aligning to shape the future for web-based education may be categorised as technical, teaching and development practices or organisational initiatives. Dramatic changes in hardware and software and the continued mainstreaming of technologies into our lives through e-commerce and entertainment are providing a powerful and unstoppable force for the growth of distance learning through Web-based education. A new generation of learners is growing up with technology and will increasingly expect it to be deployed in undertaking training. Organisations, including Schools, are Developing better IT infrastructure and systems for efficient business and will be seeking to leverage off those efficiencies for the delivery of training. Businesses are seeking more skilled and flexible workers who can 'hit the ground running' and already possess some of those attributes thought once only achieved through experience. The only certainty is change, and the only way to effectively accommodate change is through having sound processes. These are processes for identifying the needs of the learner, for designing experiences that efficiently meet learning objectives, for choosing appropriate technologies and creating motivating learning designs, and for measuring learning outcomes. Much of the hype about the efficacy of web-based learning in the work-place focuses on claims of cost efficiency. Moses typically argues as long as virtual-learning can provide equivalent or better outcomes 'at the same or lower cost than traditional training,' then it will flourish. Brandon Hall's study of learning through web benchmarks in 10 major companies reveals 'massive results' (IBM saving $200m in one year) by reducing time spent in formal training and increased scale, though he does concede the emphasis is beginning to switch from cost reduction to increased value.

5. Conclusion

Current web-based learning systems have been focusing on the interrelations between us and the system. Hence, the system, if de intelligent, must be capable of detecting needs, following their footsteps, and fina adapting to their needs. We argue that this is not enough. We have been ignoring the dynamics of the open Web. As such, we believe that two kinds of collaborations should be considered here: one is the collaboration between the system and its users; another is the collaboration between the system and the open Web in response to the changing needs of the users. Another concluding remark is that: in order to enable the involvement of students in a more active learning style, more interaction between the web based systems and the student is needed. The dialog can include both natural language and GUI actions and should have a natural language processing component built into the Web-based educational system, which is used to interpret students' responses and generate follow-up dialogs.

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