Implementing Information Technology in the Learning Process

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Abstract: - Information technology allows learning to take place anywhere and anytime. However, living in an increasingly digital world does not automatically mean that learning has become easy. Learning is a constructive process where the learner is in the central role. Technology should here be a tool that helps in learning, not the main issue itself. In order to use information technology successfully learners and teachers need to have knowledge and skills in using technology so that learning remains in the main focus.

Key-Words: - information technology, education, learning, e-Learning

1 Introduction

Information technology has changed many things in the western world. Computers, networks are used widely in almost everything. Anytime and anywhere are the slogans of people living in the 21st century. Today most modern learning environments are built on top of the internet and are accessible when learner's computer is connected to the internet.

Learning is an active, constructive process [1]. The student is expected to be motivated and active in processing data from a variety of sources so that it can be transformed into meaningful information. In this context the role of technology is to support the learning process [2], [3], [4], [5]. The actors who are involved in learning need to have knowledge and skills to use technology wisely so that it supports the learner in the best possible way.

In this paper we look at the role of information technology in education and learning. What has the impact of information technology been in this context? Has traditional classroom-based education become obsolete?

2 Learning environment

The learner – or student - is a key person in education, should it take place in school or outside it. In class-rooms interaction between teacher, student and fellow students are important, in other contexts there are additional actors. Whether learning takes place in school or not it may be noted that information technology has had an impact on how we today understand studying and learning. The learner is expected to take action, use different tools and technologies in gathering and processing data into meaningful information. However, technology should not have a central role, instead it should support the learning process in the best possible way [6], [2], [3], [4], [5].

In this chapter we look at the impact of information technology on learning, and the changing roles of learners and teachers in the increasingly digital learning environment.

2.1 Towards e-Learning

In the 21st century it has been widely acknowledged that learning can happen also in other places than traditional classroom. Traditionally school and the classroom has been the place where learning takes place. Instead, modern learning environments use e-Learning technologies which allow studying anywhere and anytime.

The term e-Learning refers to learning which takes advantage of information technology, computers and networking. Usually part of the learning material is accessible with a computer, and the learner can access the material on a 24/7 basis. It is still common that the way in which technology is used varies. Courses may be fully on-line courses where all material, exercises and tutoring is "digital", based on computers and networks. It is possible that there is no face-to-face contact between the student and the teacher, or with fellow

students. In most cases education is only partially computerized so that part of the teaching, tutoring, group work and similar activities are done with traditional methods. This is referred to as "mixed mode" education. In contrast to fully "digital on-line courses" which may be demanding because of minimal human interaction can "mixed mode" education combine the best elements from new technology and traditional educational methods.

Technology can be used in learning purposes in several ways: it may be a humble tool used in accessing information, but in the most sophisticated form it may have a core role in the learning process [7]. Information access refers to technology whish is primarily designed for delivery of digital information. For example, a library information system can be seen as technology which is built for information access and delivery. At the other end of the continuum are technologies which can be a vital part of the cognitive learning process. These technologies and systems are developed to support, enable and empower the information construction in the learning process [8]. Systems like Moodle and WebCT are examples of platforms which are developed to learning purposes.

2.2 Role of technology

Information technology has an increasingly central role in education. Today computer and internet are as natural learning tools as pencil and paper were earlier. Technology is all around us, and it affects also education. Information technology is now being used extensively in all stages of the learning process, from kindergarten to universities. This seems to be the way of the future, e-Learning will have a significant impact on how we learn and how we can process information.

The role of information technology in education is typically is characterized by [6]:

- *The use of student-centered technology*: meaning that technology is being used by students in various activities, not only in accessing information content
- *Realism*: technology-empowered learning tries to replicate the real-life learning situation, tasks are as realistic as possible
- *Technology functions as a tool* that mediates in learning, and furthermore
- *Modern learning environments* should be analyzed within today's society, change and evolution

It is believed that modern learning environments should motivate and engage learners in reflective thinking and active knowledge construction [3], [5]. This may be interpreted so that the pedagogical goals have not changed much in traditional and modern learning environments. Clearly, the range of pedagogical learning tools is much wider today.

It is vital that those involved in education and learning – especially the teaching staff – know how to use information technology. In learning the tools should not be the issue, it is interaction between teachers, students and fellow students that should be emphasized [3], [5]. This is where the potential of technology lies, instead of doing things alone technology could help teachers and students change opinions, ask questions etc. But how could this be accomplished? What if technology isolates rather than brings learners together?

3 Knowledge and skills

Information technology has changed the roles of teachers and students. Today teachers are acting more and more as facilitators and tutors, and their task is to facilitate and orientate the learner in the learning process – instead of lecturing. The student is expected to be motivated, active learner who processes information from variety of sources into meaningful structures. Here information technology is increasingly important.

It is important to understand the potential that technology has in education: with computers access to information is easy, and learning anytime and anywhere becomes possible. On the other hand, technology has limitations: connections have limited bandwidth and therefore video broadcasting can be problematic, for example. It may also be argued that when learning takes place "through a small computer screen" it is different than attending a real-life lecture in a classroom.

Managing technology is a challenge for both teachers and students. Both should have skills and knowledge in computers, networking technologies and different learning-related applications. Overall, teachers should be able to work with digital format. There are many stages here, ranging from planning, preparing material, teaching to feedback and evaluation, and in every stage technology may be used. This means that teachers must know how to use different devices (cameras, scanners etc.) and deal with file types, applications, file transfers and other IT-related issues. As a result, the management of technology may become overwhelming, at least for those who are not experienced computer users. Technical and also

pedagogical support should therefore be available so that teachers could concentrate on content rather than technical problems.

Students are challenged too. Today students have to be skilled computer users in order to study. Information is increasingly in digital format, and the students are expected to use computers to work with the material. Computers are also used in keeping in touch with the lecturers with email, for example.

It is not surprising that there is a need for support in using technology. This is evident in the beginning of studies. However, also later is hands-on advice sometimes needed. When the student is in school can support arrangements be done, for example an IT-expert or help desk may be contacted in order to solve problems and get questions answered [9]. Should the student be at home or somewhere elsewhere away from the school is support not as easily accessible. This is the case in most e-Learning environments. Here student is supposed to be technically skilled, or at least able to find solutions without hands-on advice. Students have to deal with technology in an increasingly complex environment, and this may cause problems and barriers for studying. Paradoxically, technology was intended to help and empower the learner, and not become obstacle for learning. Clearly, tutoring and information on how to use technology is needed in order to make it in the digital environment.

4 Implementing technology

Even though there are new technologies available to be used in education, the basic pedagogical aspects remain often unchanged. One might argue that both teaching and learning related methods should be re-evaluated and adapted.

Adaptation plays an important role in the use of technology. In e-Learning environments there are basically two types of adaptation [10]: adaptation to client device and adaptation to user's behavior.

Adaptation to client device addresses the problem of different computers and technologies that the user – learner – may be using in the learning process. It is common that the learning environments are built on internet so that the learner can access it with a browser. However, it is not known what kind of computer terminal (desktop, laptop or mobile device) the learner may use. While designing the environment it should be understood that there are a variety of different computer terminals with different operating systems accessing information. Furthermore, the processing power and network speed are different depending on user's terminal device and location. Therefore, using bandwidth-demanding content is not recommended as learners are likely to have difficulties accessing the material. One possible solution here is to provide a low-bandwidth/high-bandwidth –option so that the learner can choose content that best fits the available infrastructure. In this case the material has to be provided for both types of users which increase the workload of content developers.

Adaptation to user's behavior means that the learning environment should fit the learner's expectations and learning styles. Ideally, technology and learning environment should adapt to different learners and learning styles [11], [12]. User interface has an important role, as each user experiences the system and the learning environment differently. How could the system be tailored to a vast number of users with different needs? The challenge can be approached by gathering and analyzing information on users so that the system could be customized to different user needs. Based on user profiles there could be alternatives, for example additional information available for those who are interested in details [13]. Despite all customization efforts it is still likely that some experience the environment simple and straightforward while some feel confused. It may not be possible to develop a system that fits all possible learners.

The successfulness of adaptation depends on both the developers of the system, programmers, system designers and teachers who provide the content. Understanding the needs of different learners is important here. It is likely that in the long run the fit between learning environment and learners will be better, technology is getting easier to use, more robust and e-Learning applications more sophisticated. On the other hand, users learn to deal with technology and new generations are better used to e-Learning environments.

5 The learning experience

In e-Learning lot of work has been done designing learning environments. Similarly, providing digital material is hard work. Will these efforts be materialized as successful learning experience?

One important issue in learning environment is the robustness. It is here understood as confidence that the environment will function as expected. The underlying technology, computers, applications and networks should be as robust and reliable as possible. Should there be problems, for example

interruptions in networking connections the confidence in the learning environment will soon be lost. The absence of teacher, tutor or technical advice staff make the situation worse, problems could be better tolerated if there were real persons that would solve the problems together. In many learning environments the learner is sitting by the computer and this kind of cooperative effort is not there – the user is facing the problems alone.

If there is no proper support arrangements it is possible that some students face problems that cannot be overcome. Naturally, in this case the learning results can be poor as the focus moves from learning to solving technical problems. As a result, special attention is needed in support arrangements and teaching learners to master technology so that they can concentrate on learning. For example, adult students may not be experienced computer users, and they need proper technical guidance and support.

Motivation to learn is a key issue; it is the driving force in learning. Feedback has an important role in increasing student's motivation, and it is considered critical for learning that takes advantage of digital learning environments [14]. Technology makes it possible to give students immediate feedback - instead of waiting for lecturer's next reception hours the student receives email. It must still be underlined that personal contact with a teacher remains important part of student guidance, orientation and motivation.

6 Conclusion

Technology has an increasingly important role in education and learning. In e-Learning environments students and teachers access and process information and interact with each others. The roles of teachers and students change: teacher's role moves from lecturing towards orientation and tutoring. Teachers are also challenged to find optimal mix of traditional pedagogical methods and information technology in e-Learning environments. In modern learning environments the students are expected be independent and active learners [**Error! Bookmark not defined.**]. What about the skills and knowledge, are we ready for this?

Here it is noted that support and guidance in using technology are important in increasingly technical learning environments. Both students and teachers must be familiar with technology; otherwise it may become overwhelming to manage the increasingly technical environment.

The learning environment should adapt to different computers and connecting speeds which are typical for heterogeneous user environment. Adaptability, reliability and robustness are important design issues here. It is also important that the technology would adapt to differently skilled users and their learning styles [15]. This needs to be emphasized as e-Learning brings education closer to new groups of learners, such as senior citizens.

The successfulness of e-Learning and use of technology in education depend on motivational issues: dedication and motivation in both development and use of the learning environment are critical success factors. Sophistication of technology is not that important, it is the motivation and will to learn that are needed.

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