Information and Communication Technology (ICT) and Education: the case of distance education

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Abstract: - Our age - one of acute sociopolitical changes and continuous technological developments - is in need of structural changes in its most important aspect which is considered the cornerstone of our society, namely in education. However, despite developments in technology and sciences, education does not seem to readily benefit from such developments in terms of improving its instruction methodologies. Education should keep up with modern developments and become more attractive both for the intended recipients (the students/learners) and the educators/instructors. Today, more than ever before, the conditions are ripe for expediting the modernization of the educational systems. The Information & Communication Technology (ICT) - in one form or another, e.g. “Computers” - are included in the curriculum of educational institutions throughout the world. In both cases the ICT represent a major learning tool in modern education. It is admitted that using the ICT for learning purposes is more fun, challenging and inspiring. Distance education changes the way work is carried out in the sector of education and can function as a tool by which modern society will be able to handle the new challenges to better pursue its educational goals. The basic question which this research aims to answer, through a theoretical analysis of the terms “learning” and “distance education”, is whether distance education can improve the educational process.

Key-Words: Learning, Distance Education, Asynchronous Distance Education, ICT

1 Introduction

It is beyond any reasonable doubt that technological changes and other developments in the quite sensitive sector of education fall behind, or cannot keep up with changes that are taking place in most other sectors of our society. The first public schools in Greece started operations when the Harilaos Trikoupis (1832-1896) was Prime Minister of Greece. Since then a number of changes have taken place, for example in the design (architecture) of the school buildings, with the buildings becoming more attractive and comfortable. Changes also took place in the students’ and teachers’ textbooks; they were changed many times and supplemented with new information over the years.

In our Information Society teaching and learning are modes by which the individual can enrich their cultural experience and knowledge, while both modalities are of particular significance to emerging multicultural societies [1]. There is need to modernize instruction using modern, innovative means and tools which can enhance the educational process, and thus broaden the learning horizons of the students. This is what the ICT can do. They make distance education possible, and we are going to elaborate more on this issue in this paper. The ICT are an important part of our modern civilization. Their application increases the demands for and the challenges in education, given that they introduce new and exciting ways of learning, harvesting of
information, establishing communication and doing work [2], [3].

Specifically, in the following parts of the article we are going to discuss about the learning process through the basic theoretical concepts of behaviorism, constructivism and the activity theory [4], [5]. Next, a few examples of distance education will be cited and the role of the educator and the student/learner will be outlined. In this context, the advantages and disadvantages, as well as the means and tools, of distance education will be mentioned.

In addition, a number of suggestions will be put forward regarding ways to better implement distance education. In the perspectives of our study there is a discussion about the prospects for future research in distance education and the use of ICT.

2 The term “Learning”
Learning is a process characteristic of all living organisms, which is difficult to define or expect a universal consensus by all factors in the sector of education. The diversified approaches to education are expressed in a multitude of definitions of the term “learning” [5], [6]. For example, learning can be defined as any stable change in the behavioural pattern of an individual, which is the direct or indirect result of experience [5]. Through learning human experience is transformed into knowledge, skills, attitudes, values and emotions [7].

According to modern views of learning and teaching [8], [9] considering also one’s access capabilities to the digital dimension of learning, learning is not only the product of teaching but also an act [10]. Based on modern technologies used in education and on current learning theories, one can observe a shift from the educator-centered to student-centered instruction or from isolated, independent learning to a cooperative environment for learning [1], [11].

Jean Francois Lyotard [12] describes the relationship between knowledge and computerized societies in the following way: “It is reasonable to suppose that the proliferation of information-processing machines is having, and will continue to have, as much of an effect on the circulation of learning as did advancements in human circulation (transportation systems) and later, in the circulation of sounds and visual images (the media).”

We can identify three main psychological theories which affected and will continue to affect the development of computerized learning environments:

- behaviorism,
- constructivism and
- the activity theory which has its roots in socio-political theories of learning [4]. However, we should not forget that a lot of educational applications using computers are the products of technological developments and have nothing to do with the psychology of learning.

The behaviorist approach emphasizes the transmission of knowledge and behavior modification. This context offers a rather “technical” approach to the relevant educational applications, and what is very important here is the setting of clear and functional educational goals that need to be attained [4].

The constructivist approach claims that preschool children possess a background of knowledge upon which new knowledge must be built. Under this theory, children (as learners) construct knowledge for themselves. This leads to the view that one of the goals of education must be to help learners to bridge the gap between formal and informal knowledge [4], [5].

The socio-political approaches cannot separate the learning process from the social, historical and cultural context within which learning takes place. Consequently, the learning processes are not seen as autonomous activities but as constituent elements of an organized whole, the mind, which functions and develops within a specified sociopolitical context which is historically determined [4], [5].

In our days education is facing a significant challenge, given that never before in its entire history did education have such powerful technologies at its disposal as in the last 30 years [1], [13].

3 Distance Education
Nowadays, learning is moving from the traditional "schoolhouse" model into the networked virtual classroom where the interactive learning environments integrated with 3D games and multimedia.

One of the main features of distance education, which distinguishes it from all other modes of education, is that the learner receives instruction and learns without the physical presence of the educator, and outside the conventional setting of a classroom. In other words, although the learner is far from the educator, both in terms of space and/or time, the learner receives guidance and encouragement by the educator through a means of communication [11], [14]. Open and distance education comprises one of the most important ways for carrying out knowledge activities.
Desmond Keegan [15] offered one of the most effective definitions of distance education, which includes the following five requirements:

- the separation of teacher and student during the entire period of the instruction process,
- the influence of an educational organization in the design of the course of study and the preparation of the educational material, as well as the provision of services for academic and learning support,
- the use of technical media and of various materials, e.g. printed materials, video, audio frequencies or personal computers for the transfer of the content of learning and for setting up interactive mechanisms,
- the provision of two-way communication,
- the absence of group learning, with students taught largely as individuals.

Keegan understands that the fifth requirement must be examined in the light of the need to create groups of learners using ICT [15]. According to Holmberg [16] distance education can be viewed as a separate field of study having its own principles, is based on experience and on a general way of thinking and learning and also on various external influences.

Since few years, e-learning has changed not only the technology of the education environment but also the educational paradigm itself. The advantages of e-learning are twofold: we can overcome the restrictions of time or space, and we can study individually and cooperatively. Consequently, e-learning systems have to be designed in a way to cope with different learning styles and goals of students. This personalization is possible corresponding to the student’s knowledge that the system stores.

In general, distance education aims to mobilize the learner into a self-learning process through a series of independent ‘search and find’ steps [17]. As an educational methodology and practice, distance education is about a century old. It started from the universities of Australia and New Zealand which offered correspondence courses as early as 1890. A similar, highly acclaimed effort in Europe was instituted by the Open University of Great Britain in 1971. Today a large number of Open Universities throughout the world are offering distance education opportunities [17], [18].

The modern forms of distance education rely on integrated information systems designed for the supply of educational services using advanced electronic capabilities (e.g. broadband connections). Basically, these systems allow education providers to offer their services anywhere in the world. Distance education offers remarkable opportunities, as well as challenges, given the need for increased flexibility in education today [11].

Currently, distance education has evolved from a mere correspondence education to a highly complex and interactive learning experience which brings both the educators and the learners into a continuous dialogue [19]. We can also claim that distance education is a modern challenge, also a new opportunity for both educators and learners, which is gaining ground by the day as an alternative form of learning and a supplementary method of teaching [14], [19]. Holmberg [16] notes that distance education is successfully applied to a variety of target groups and is particularly convenient for adult learners.

There is a lot of discussion today, either politically oriented or not, which underlines the need to reform education with the aim to change the traditional methods of learning and instruction. The “intelligent” school and the ICT, which infiltrate all levels of our society, can be a major support for the changes contemplated in education. The “intelligent” school is a school which utilizes the ICT capabilities to offer modern methods of instruction, interactivity between the educator and the learner and a rich learning content. At the same time the new technologies and related applications contribute to the implementation of the “intelligent” school. Consequently, the Internet is the channel through which the information society is being shaped and person-to-person communication is established, including communication between the learner and the educator.

Distance education often offers equal opportunities for education to all, particularly to people with special needs, to individuals living in geographically isolated regions or away from urban centers. It opens up basic education, and the benefits of knowledge, to a large number of young and older people who for economic constraints had to drop out of school at some point in their lives. At the same time computer networks and the Internet offer opportunities for cooperation, the exchange of views and the supply of opinions on issues regarding the educational process among all the interested players [1], [11].

In addition, distance education enables the direct exchange of information in various electronic forms (text, images, video) and anywhere in the world. Based more on collaborative learning, distance education can offer new modes of instruction and learning, thus enhancing the existing ones and
broadening the effectiveness of instruction by making it more appealing to learners.

3 The role of the educator and the learner in distance education

Both the profile and the role of educators and students change within an electronic education environment. The educators are required to increase, even intensify, their actions in the educational process which is mediated, and shaped, by modern technology [1]. This is true because the developments in ICT add new dimensions, and more even intensify, their actions in the educational environment. The educators are required to increase, students change within an electronic education. Both the profile and the role of educators and learner in distance education

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• it must be easy for learners to return to previous teaching material (units),
• each unit should make reference to the specific educational goals it aims to achieve,
• the proper use of examples, images and demonstrations must be observed,
• the content of the course must suitable for the target learners,
• smooth transition from one subject to another,
• continuous feedback to the learners,
• simple instructions for navigation through the electronic material,
• self-evaluation activities, and
• the units must use simple examples from real life.

The same principles should be mentioned also during the planning of distance education per se, given that its implementation is largely based on electronic content. The basic forms of distance education are the synchronous and the asynchronous. The synchronous modality is a process of direct, real-time contents delivery and educator-learner interaction.

The basic advantages of this type of distance education compare to those of traditional education; for example there is direct contact between the educator and the learner. The disadvantages have to do with the costly equipment and the demand for achieving synchronization between the educator and the learner before this type of education can best be put to use. The Internet and its applications, the networks for multimedia applications, the local area networks and the metropolitan networks, the MBONE technology, and others, are some of the technologies utilized in synchronous distance education.

In asynchronous distance education there is no real-time communication between the educator and the learner. The advantages of this type of education are many and powerful. For example, in relation to the synchronous it costs less; it offers education opportunities to people with special needs because it is more flexible; and the educators are more skilled and qualified. The asynchronous distance education is more popular since it can adapt faster and better to the needs of the learners who do not have to leave their home to meet their educational needs.

However, one of the major disadvantages of asynchronous distance learning is that a learner may feel isolated or less motivated because in this process there is no opportunity for real time interaction with other participants. In addition, unlike synchronous learning, asynchronous learning does not offer instant feedback on the student’s performance. Also, there is the issue of copyright and the issue of verifying the identity of the learner. Asynchronous distance education is mainly carried out through e-mails, the use of pre-recordings in CDs, DVDs, in virtual learning environments, using simulation programs, videos, films, etc.

5 Suggestions for implementing distance education

The basic question which emerges when contemplating distance education is whether the particular environment it represents can ultimately improve the educational process. Before an answer is given to this question, one should examine the conditions under which distance education can be applied and developed in the context of our modern educational process.

A basic condition for applying distance education to modern schools is the gradual, step-by-step adaptation of the learner to modern technology. Also, the establishment of rules and procedures is necessary before distance education can be implemented. In addition, the acquaintance and the building of a trust relationship between the educator and the learner are factors which contribute to a smooth and effective implementation of the new technology, as is also the case, for example, with the careful application of a schedule for the distance learning course. Another important consideration is that both the educator and the authors of the educational material must have a very good command of the language to encourage the learners in the process of distance learning.

Furthermore, with the aim to implement distance education in an optimal manner, a number of rules can be laid down to govern the compilation and organization of the teaching material. The extensive use of examples, the holistic approach, the adequate presentation and explanation of the various tasks, the linking of the course with real life situations, the emphasis on critical thinking and the seamless linking of old material with new are the key elements upon which the organization of a distance learning course can be based [14].

6 Conclusions - Discussion

Nowadays, with the development of ICT (Information and Communication Technology) and the rapid growth of e-learning, educational procedures in tertiary institutions change in a considerable manner. The implementation of virtual learning environments depends on decisions related to the educational design and on other decisions...
related to technology itself and the selection of the most appropriate system and tools.

The answer to the question whether distance education ultimately improves the process of education is beyond certitude. There is no doubt that distance education and the ICT enhance education but under certain conditions, which were briefly outlined in this work.

The ICT offer education new tools and opportunities by creating a different and an engaging set up for instruction and learning. As a result the learners become actively involved in the creation of knowledge for themselves in the context of a socially and historically determined environment. However, is spite of the very good prospects which accrue from the use of the ICT, we are occasionally tempted to overemphasize the means and loose sight of the set goals.

In general, distance education can supplement traditional education and gradually expand its goals to become accessible to more and more members of our multicultural society and thus create new learning opportunities for all [1].

7 Perspectives

Changes in the mode of education are necessary, ongoing and inevitable. Modern society places on its members the demand for continuous education. This makes traditional education only a part of the educational system. Distance education often allows participants to access updated information at any time or place. It also promotes independent learning and at the same time encourages individuals to make informed adaptation decisions in view of the changes that are sweeping their lives [9].

The anthropocentric view of education presupposes accessibility to education for all, with distance learning coming closer to this goal than any other form of education. However, in this age of information and rapid technological and socio-political changes, equal access to information sources does not guarantee also equal status in the current globalized environment.

The human mind processes information consciously or unconsciously to produce and commit to memory pieces of knowledge. The filtering of information is a key factor for making sound judgments, for creative thinking and proper action, particularly in our age when people are overwhelmed with information and volumes of new knowledge. In addition, particular attention requires the design of the distance education platform, which must be guided by a realistic model of learning. Next, this design must be evaluated to establish whether or not and to what extent it meets the set educational goals, or whether it needs to be adapted for optimal results.

On condition if the electronic platform is properly designed and tested, it can promote action among participants and sensitize them towards a paradigm shift which involves the transition from traditional education to modern education in digital environments. However, one more major task in the planning of distance education is the evaluation of the electronic platform in terms of suitability and capabilities.

With the growth of Internet and the spread of ICT, we have to respond to a huge demand of new educational approaches and tools. In this context, Web-based education or e-learning is one of the most modern solutions. This way of teaching is getting an increasing popularity due to its numerous benefits: it permits to gain the potentials of immediacy, relevance, interactivity, authenticity, etc. However, the arisen of this way of education needs new didactic models. Both pedagogical and technological aspects must be carefully reviewed. From a pedagogical perspective, it is necessary to develop new training models that clearly define how to organize new training paths and how to present their content in a way that will benefit the user. As for the technological aspect, new tools for distributing knowledge must be created: tools that are able to reproduce as accurately as possible the pedagogical training models.

References


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