Educational Technology – Benefits and Drawbacks in Enhancing Knowledge Acquisition Efficiency

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Abstract: *The paper provides an overview of the use of educational technology in the process of knowledge acquisition. The importance of educational technology as an indispensable factor in supporting education was highlighted. The study indicates the importance and necessity to study and apply modern educational technology in education. The development of innovative technology, starting with personal computers, through networking - the Internet, has led to creation of new opportunities for innovation and change in the educational process. Today, young people in the education system demand even more innovative ways of acquiring knowledge. Growing up with the daily development of technology enables them to become more independent and ready for self-education and lifelong learning.*

Keywords: *educational technology, innovative technology, teaching process, education*

1. INTRODUCTION

Education is one of the factors that influence changes in society. In order for education to have a stimulating effect on technological development, it is necessary to make some changes such as: changes in the educational process related to the education system, digitization of education and its impact on the forms, methods and ways of functioning. Problems in education, such as outdated curricula, poor working conditions, and a lack of essential teaching materials and aids, impact the outcomes of the educational process. Due to the constant development of technology, it is necessary to update program content, educate teaching staff, and introduce innovations into the teaching process.

2. EDUCATIONAL TECHNOLOGY-DEFINITION AND DEVELOPMENT

Educational technology can be defined as: 1) a systematic and organized process of applying modern techniques and technology in improving the quality of the educational process (efficiency, optimality, etc.); 2) a systematic way of conceptualizing the implementation and evaluation of the educational process, i.e. learning and teaching, with the application and help of modern educational teaching techniques. It includes teaching aids, methods and operations and relationships management, i.e. the behavior of all participants in the teaching process [1].

Educational technology includes being familiar with students, determining the goals of their education, specifying possible organization of teaching, planning the content of education, choosing methods and teaching tools, determining the position of teachers and students in teaching and evaluating the achieved teaching and learning results. Education technology includes the organization, implementation and verification of the teaching and learning process. That is why it is an essential factor of teaching and learning, and not simply a technique or a tool used by the teacher [2].

Educational technology is a set of techniques and procedures used to improve communication and knowledge transfer. Similarly, educational technology can be defined as the use of new technology to promote innovation in the educational field. The concept of educational technology can be defined in two ways:

- In a narrow sense – this includes those who limit educational technology to the use of technical tools in the classroom and believe that having full technical equipment is the best way to maximize teaching efficiency;

- In a broader sense – this includes those who encompass organization, teaching methods and procedures, and the application of teaching tools, including the most modern technical means within educational technology.

Application of educational technology plays a key role in providing new and innovative forms of support to teachers, students and the learning process itself. The digitization of all segments of society and the increasing demands for a highly qualified workforce increasingly require support in education. Determining the best tools to support learning and increase the efficiency of education systems is crucial. The popularity of the Internet and Information Technology has provided a platform for educational institutions not only to deliver information directly to students, but also to establish interactive communication [3]

Educational technology develops in three main directions: (1) mass communications; (2) individual learning and (3) group learning. Each of the directions consists of three subsequent phases: the research phase, the development phase, and the application phase, as shown in Table 1 [4].

Table 1. *Educational technology-historical development*

Mass communication (1940)	Research (1950)
	Development (1955)
	Application (1960)
Individual learning (1945)	Research (1960)
	Development (1970)
	Application (1975)
Group learning (1950)	Research (1975)
	Development (1980)
	Application (1985)

The rapid development of technology has an essential effect on the effects of the education system - techniques, methods and contents. Thus, for example, networking and the web have become a critical basis of computer technology, but at the same time one of the most important pedagogical tools, conditioning changes in the educational system itself, not only in computer science but also in other areas. The role of the lecturer is also constantly changing in the whole process, but it still remains crucial: although information globalization allows students to visit distant museums, archaeological sites, communication via video conferences, the lecturer is there to teach them critical thinking, social behavior, work discipline, personal responsibility, which develops and supports curiosity [5].

With the invention of computers and the Internet and the advent of the scientific and technological revolution, new teaching aids are slowly being introduced into teaching [6]. New sources of knowledge appear, in the form of modern teaching media such as computers, laptops, mobile phones, tablets, smart TVs, interactive whiteboards, electronic books and textbooks, which facilitate, complete and improve the learning process [7].

3. AN OVERVIEW OF VARIOUS TECHNOLOGIES/TOOLS IN USE

Web 2.0 tools can offer significant support to teachers in their working and classroom organization. Web 2.0 represents a new and improved generation of the World Wide Web [8]. It can be described as a platform that enables user interaction. Many of these tools are free to download and accessible to everyone, making them highly effective for use in schools as a supplement to traditional teaching.

The following categorization of Web 2.0 tools is most commonly found in the literature review [8]:

- Learning Management System (LMS) - Moodle, Blackboard, Canvas, WebCT, Claroline, etc.
- Media sharing tools - Flickr, YouTube, Google video, etc.
- Tools for communication and social networking - Skype, X (Twitter), Facebook, etc.
- Collaborative tools - Bubbl.us, Imagination Cubed, etc.
- Tools for creating teaching materials - Bitstrips, Prezi, Quiz Revolution, Crossword Labs, Slidestory, Nanolearning, Go Animate, etc.
- Tools for creative learning - Jot Form, Bubblr, Bubbleply, Mojiti, etc.

Learning management systems

Learning Management Systems enable the management, distribution, and publication of catalogs, courses, lessons, or lesson segments, and include, record, and manage information about learners, students, and teachers [9].

There are two groups of such systems: learning management systems with a free license and commercial systems [10].

1. Learning management systems with a free license [11]:
   - Moodle
   - ATutor
   - Claroline
   - Site@School
   - Dokeos
   - World Circle
   - OLAT
   - ILIAS
2. Commercial systems that provide electronic learning management [11]:
   - WebCT
   - Blackboard
   - Knowledge Presenter Learner
   - Learn2Learn
   - Sakai
   - eCollege
   - JoomlaLMS

4. EDUCATIONAL TECHNOLOGY - ADVANTAGES

Educational technologies are used by both teachers and students. They make it easier for teachers to improve students' knowledge and skills, while students, using educational technologies, improve their experience and facilitate the acquisition of new knowledge.

Students are in the focus of the teaching process (figure 1), and various forms of interactivity are incorporated into teaching:

- the structure of the learning environment is adjusted to suit the students' needs
- the teaching process is focused on the students
- students are encouraged not only to receive information, but also to do research as much as possible, to think critically about, to work independently or as a team
- both teachers and students are encouraged to be the members of the team that collaborate in the teaching and learning process.

Figure 1. *Student in focus of the teaching process*

Other advantages include [12]:

- increased collaboration: local or cloud computing systems can help to solve the task. On the other hand, this allows students to work as a team, without having to be physically present at the same time in the same place
- economical management of the teaching materials: Educational Technology tends to reduce the cost of educational materials, e.g. using the cloud for data storage
- better dissemination of content: content is available to students 24 hours a day, 7 days a week, e.g. pre-recorded lectures
- personalized education: students can be flexible when they need to organize studying process based on their own interest and pace. Also, educational technology makes it possible to assess students' progress.
- paying more attention: using different dynamic content keeps students focused on their activities.

By using educational technology, the number of teaching resources significantly increases. In traditional teaching, the textbook and teacher were the only sources of information. Today, educational technologies make teaching materials available to students, stimulating their interest and encouraging research to better master and memorize the content. Preparation, organization, and implementation of the teaching process with the help of educational technologies provide numerous opportunities such as [13]:

- achieving proximity to educational content through clear presentations, interactive software packages, and via the internet;
- enriching the learning environment and work environment with educational contents;
- engaging multiple senses when interacting with educational content;
- facilitating easier and continuous connectivity and the possibility of correlating educational content across multiple subjects.

4.1. Why do students need technology in the classroom?

1. It simplifies access to educational resources - students today use their smartphones and tablets outside of school hours, and they should be trusted with responsibility during school hours too. Educational technologies help students stay engaged during class by using familiar learning tools.

2. Promotes the learning experience - by incorporating educational technology, teachers can develop more creative and innovative lesson plans to maintain students' attention in their classes.

3. Students can learn at their own pace - educational technology can enhance individual learning by removing educational barriers that teachers may face. It enables online education, distance learning, and access to updated information. Since each student interprets information differently, technology can facilitate deeper exploration of subjects that are more challenging to learn.

4. It helps students prepare for their future careers - integrating educational technology in the classroom can help students feel more confident and comfortable as they approach the beginning of their careers. It can also enhance classroom interaction by encouraging collaboration among different learning styles.

5. Students demand it - students today feel comfortable using technology from a young age. When new material is presented to students using tools they have already mastered, they feel confident in their ability to learn new material [14].

5. EDUCATIONAL TECHNOLOGY - DRAWBACKS AND CHALLENGES

Although Educational Technology offers numerous advantages, its use can also lead to various problems, such as [12]:

- Adaptability: Technological changes tend to be faster than the willingness and capacity of teachers to accept these changes. Generally, it forces teachers to make a significant effort to master and adopt the use of new technologies.
- False information: The vast amount of available information presents a challenge for students, especially when it comes to distinguishing between true and false information. With more information, misinformation also increases.
- Outdated educational systems: The difference in quality between educational systems with different resources increases and those with fewer resources are less efficient.

The application of educational technologies in teaching has not resolved the issues of rationalization and efficiency in teaching. However, despite the fact that significant results have been achieved through the application of educational technologies in the teaching process, numerous problems still exist. These problems can be broadly categorized as follows:

- Problems arising from the definition and understanding of the concept of educational technology;
- Problems related to the teachers' ability to apply modern educational technology.

When it comes to defining and understanding the concept of educational technology, analyzing this issue leads to the conclusion that educational technology in the teaching process involves ICT technical means and resources, as well as applied knowledge from pedagogy, didactics, psychology, and communication. If educational technology were separated from these sciences and their disciplines, it would be reduced to mere technique and the use of machines. The tendency to reduce the content and functions of educational technologies to a set of technical means, machines, and apparatuses, while neglecting appropriate content, methods, and teaching principles, is unacceptable. Therefore, "educational technology is an interdisciplinary pedagogical discipline whose content integrates specialized technical-technological, cybernetic-informatics, pedagogical-psychological, and didactic-methodological knowledge and skills" [15].

One of the reasons that has contributed to the unfulfilled expectations regarding the implementation of educational technologies in teaching relates to teachers and their readiness for successful application of educational technology in organizing and implementing the teaching process. Numerous studies and analyses of the current state of practice show that "teachers generally possess basic, but not necessarily sufficient knowledge for functional use of educational technology, especially computers in teaching; even when modern educational technology is used, it is more often applied in lesson preparation than in actual teaching; the use of educational software is negligible; teachers often train themselves for its application using literature or with the help of more experienced colleagues; a small number of teachers keep up with innovations in educational technology; and a significant number of education professionals do not use the internet network at all" [16].

6. CONCLUSION

Educational technology has undergone rapid development in recent decades, with people embracing them eagerly because they make life more comfortable. The application of such technology is considered vital for education. Significant investments are made in the improvement of new technology, the development of new software that would integrate and replace many traditional teaching tools, and the training of teaching staff for more efficient use of new educational technologies in the teaching process. Moreover, educational software is also being created and designed so that students have access to online content both during classes and at home for independent study.

The application of educational technologies aims at achieving progress in acquiring new knowledge through various means and learning methods. Changes that have occurred in all spheres of life, driven by the development of science, technology, and modern technologies, impose a new approach in teaching, new learning technology, communication, information processing, classroom management, and educational planning.

Since students use various technologies daily outside of school, integrating educational tools into the classroom helps make the learning process much easier. Educational technologies simplify the way teachers do their job, providing efficient ways to establish relationships between teachers and students.

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