

E-LEARNING AND IMPLEMENTATION OF MULTIMEDIA TOOLS TO IMPROVE THE TEACHING PROCESS IN HIGHER EDUCATION

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***Abstract:** This paper presents different varieties of possibilities and aspects of the application of information technology technologies and tools for the purpose of application and upgrading of the teaching process in higher education. Today, e-learning is one of the pillars of educational tools, primarily due to the application of equal quality of the traditional education system and the time and space save in the teaching and scientific process. The application of multimedia tools in the teaching process means the introduction of innovations in order to facilitate the understanding and acceptance of teaching materials. The teaching process of today's education inevitably takes new forms by introducing e-learning and multimedia tools that support teaching in various forms of use. Traditional learning and a systematic approach to education today have different priorities compared to the last century. Today, the academic title is a priority for advancement in every sphere of business progress. By using educational tools such as e-learning and gaining insight into the use of multimedia tools in terms of improving existing knowledge, users of these systems gain quality of service, an innovative basis for expanding the level of education and the ability to apply all acquired skills in practice*

***Keywords:** E-learning, information technologies, education, teaching process, multimedia tools*

INTRODUCTION

Distance or online learning includes many segments characteristic of traditional forms of learning such as: sharing ideas, discussions and other ways of sharing information and accumulating knowledge. (Rasthy, 2003.) However, this modern form of education has certain advantages over the traditional way of learning such as: time to analyze received information and ask questions, improved communication between students, the ability to share information and disseminate knowledge among students, the ability

to start open discussion because individuals easier to open and speak online than in real conditions, achieving a higher degree of motivation and involvement in the educational process itself. (Jauković Jocić, 2020.)

For hundreds of years verbal messages such as lectures and printed lessons have been the primary means of explaining ideas to learners. Although verbal learning offers a powerful tool, this book explores ways of going beyond the purely verbal. Recent advances in graphics technology have prompted new efforts to understand the potential of multimedia and multimedia learning as a means of promoting human understanding. (Mayer, 2009.)

A crucial position in the development of e-learning has the moment when multimedia systems are implemented in learning systems. The implementation of multimedia systems has increased the quality and effect of consumption of electronic educational materials. As the most important factor that multimedia has brought with it is the possibility of real interaction, which has proven to be a key factor in the quality and efficient use of electronic content in the teaching process.

Multimedia learning refers to learning from words and pictures. (Issa, Schuller, Santacaterina, 2011.) The paper discusses the place and role of multimedia systems in e-learning systems in general and with special emphasis on higher education teaching processes.

DEVELOPMENT OF E-LEARNING IN THE EDUCATIONAL PROCESS

The development of information and communication technologies has brought with it numerous advantages in the modern process of education.

The promise of E-Learning is that it brings powerful new tools for improving competency and capability, speed, and performance whether an organisation operates at one geographical location or at many. Just as the rise of ICTs fundamentally changed the nature of how work and communication gets done, the emergence of E-Learning technologies is fundamentally changing the nature of how people learn. People are more and more encouraged to learn by themselves and to only learn what they really need to know to perform their task optimally. (Nagy, 2005)

Electronic courses have enabled the acquisition of quality education to those users for whom education would not be available in other circumstances. Online education has brought cooperation to the forefront and forever changed the traditional way of education, which meant a more

classic and passive way of transferring or acquiring knowledge.. This type of education allows you to attend a particular course regardless of location and time because the user can access the lectures anytime and from anywhere. What the user needs is a personal computer and access to an internet connection.

Effective integration of ICT and the learning process has great potential to involve and engages students on a larger scale. For example, using multimedia for presenting of authentic and poorly structured problems in learning based problems can motivate and stimulate students and thus develop their problem solving skills. (Savery, Duffy, 1995.)

In order to understand the learning and teaching process a framework has been made that will allow one to speak about a wide range of learning models with different theoretical foundations. Frame for successful learning is to align three elements: Learning goals, learning activities, and feedback and evaluation. (Berge, 2002.) By integrating these elements and the presence of multimedia as the backbone of access to knowledge, we will get a comprehensive system of modern education.

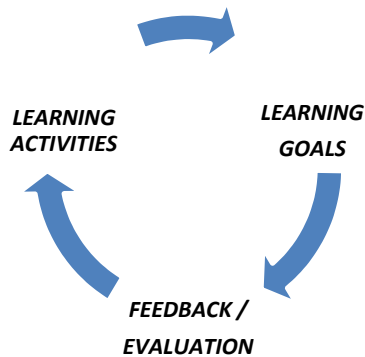


Figure 1. Active, interactive, and reflective e-learning
Source: Berge (2002)

Online courses are typically defined courses where at least 80% of the content is delivered online without face-to-face meetings. Face-to-face instruction (F2F) is defined as a course where all content is delivered only in a traditional face-to-face setting. In addition to online and face-to-face learning courses, there are hybrid courses, which combine the benefits of face-to-face with the technology often used in online courses. According to the authors, 30-79% of the course is delivered online. Lastly, a fourth type of course exists which is referred to as the web-facilitated course, where 1-

29% of the course is delivered online. Although this type of course is actually a face-to-face course, it uses web-based technology to supplement the face-to-face instruction provided to students. (Allen and Seamans, 2013)

Proportion of Content Delivered Online	Type of Course	Typical Description
0%	Traditional	Course where no online technology used — content is delivered in writing or orally.
1 to 29%	Web Facilitated	Course that uses web-based technology to facilitate what is essentially a face-to-face course. May use a course management system (CMS) or web pages to post the syllabus and assignments.
30 to 79%	Blended/Hybrid	Course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has a reduced number of face-to-face meetings.
80+%	Online	A course where most or all of the content is delivered online. Typically have no face-to-face meetings.

Figure 2. Changing Course: Ten Years of Tracking Online Education in the United States
 Source: Allen & Seamans (2013)

Distance learning programs have been developed primarily because of students who cannot attend lectures due to business or family commitments, distance or high costs required by the traditional way of studying. From the above facts we can conclude that the era of modern online education is on the rise and will forever change the notion of acquiring knowledge.

IMPLEMENTATION OF MULTIMEDIA IN THE TEACHING PROCESS THROUGH E-PLATFORMS

Learning is primarily the process through which we become the human beings we are, and it takes place through a variety of media, strategies, and processes, of which interactive multimedia is just one. Using these media and technologies, we internalize information and knowledge available in the external world to construct our own experiences. (University, 2005)

In accordance with the sudden changes and development of science and technology, the teaching process should be modernized by applying modern educational technology. Teaching tools such as multimedia tools, content and information-educational software allow students to explore all sources of knowledge with their own critical approach, to improve learning

stability, analyze, compare, research and apply their knowledge in different situations.

The emergence of multimedia in education dates back decades. The system of knowledge acquisition has never been more modernized than it is today and provides all users with the possibility and opportunity of faster, easier and more efficient absorption of information and data.

Multimedia learning involves learning from words and pictures and includes learning from textbooks that contain text and illustrations, computer-based lessons that contain animation and narration, and face-to-face slide presentations that contain graphics and spoken words. (Mayer, 2009)

Multimedia tool such as pictures can support recall and comprehension when showed prior to or simultaneously aligned with the text. This objective improvement in learning is usually paralleled by a subjective improvement. Specifically, there is evidence that students who learn with text and pictures use the pictures when they are important for learning while they can also reflect at a metacognitive level on the reasons why a picture is important (e.g., Antonietti, Colombo, & Di Nuzzo, 2015). Furthermore, in multimedia conditions, students usually indicate higher confidence to do well on subsequent tests (higher judgments of learning; JOL) and actually showed better test scores than students who learned with text alone (e.g., Eitel, 2016).

The concept of multimedia tools in the teaching process is explained in more detail in the numerous professional literature, but the overall definitions are reduced to the existence, improvement and raising the quality of the teaching process in order to achieve overall customer satisfaction.

Multimedia can be viewed as a learning tool and a means of communication. Within learning situations, multimedia products and online services can be used creatively and reflectively.

Furthermore, multimedia can be used to foster learning subject matters and cross-curricular topics. General goals of education frame the use of multimedia in education. The following goals of education can be considered as important:

Construction of meaningful and understood knowledge: This means the development of a well-structured, disciplinary, interdisciplinary and daily-life-oriented system of flexible and usable competencies, abilities, skills and content knowledge.

Construction of applicable knowledge: How to transfer meaningful and understood knowledge into applicable knowledge?

Construction of knowledge about learning. This important competence enables students to be experts of their own learning processes. Consequently, reflection and metacognition of learning processes support the construction of meaningful and understood knowledge as well as applicable knowledge. (Andersen, Brink, 2013)

By applying animations using multimedia resources such as sound, image, virtual classroom, etc., users of e-platforms get comprehensive information and easier to understand the material they are accessing.

Multimedia provides a technology based constructivist learning environment where students are able to solve a problem by means of self explorations, collaboration and active participation. (Neo, Neo, 2009) Simulations, models and media rich study materials like still and animated graphics, video and audio integrated in a structured manner facilitate the learning of new knowledge much more effectively.

The interactive nature of multimedia provides the room to enhance traditional "chalk-and-talk" method of teaching with more flexibility to learners to adapt to individual learning strategy. (Neo, 2007) It enables both the educators and learners to work together in an informal setting. The role of educators and learners are extended. Furthermore, it encourages and enhances peer learning as well as individual creativity and innovation. (Malik, Agarwal, 2012)

In multimedia learning the learner engages in three important cognitive processes. The first cognitive process, selecting, is applied to incoming verbal information to yield a text base and is applied to incoming visual information to yield an image base. The second cognitive process, organizing, is applied to the word base to create a verbally-based model of the to-beexplained system and is applied to the image base to create a visually-based model of the to-be-explained system. Finally, the third process, integrating, occurs when the learner builds connections between corresponding events (or states or parts) in the verbally-based model and the visually-based model. (Mayer, Moreno, 1998)

A more detailed presentation of cognitive processes is shown in the figure below.

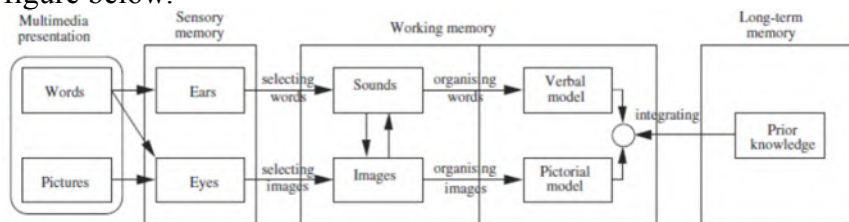


Figure 3. The Cognitive Theory of Multimedia Learning
Source: Mayer (2010a)

CONCLUSION

The traditional education system is still considered an exemplary source of knowledge, but its place is accompanied by an electronic approach to learning and acquiring knowledge. Today's education brings with it a number of challenges that threaten the weakened effect of knowledge transfer to all generations, and it is ultimate time for more innovative steps towards achieving new goals in the education system.

By using all available tools in education, either traditional or online, we improve the teaching process and upgrade the existing education system. Multimedia, as an area in education, has become an indispensable tool in creating, administering or running all online courses.

With each new challenge before us, the education system is constantly changing and improving so that it follows all current trends and can respond to every challenge that lies ahead.

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