№3 (4), 2022 ISSN: 2682 – 9517(print)ISSN:2683– 0930 (online)

INSTITUTE OF INFORMATICS AND INNOVATIVE TECHNOLOGIES

Electronic educational resources in aid of technological learning in the new informational environment

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Abstract. **Electronic educational resources are a universal tool for organizing technological learning in the new informational environment. Through them, educational and reference information can be obtained in a variety of forms, the process of knowledge acquisition can be productively organized, skills and habits can be acquired for independent studies or practical activity, and the results of the learning process can be effectively monitored and controlled.**

Keywords: **digitalization, e-learning, educational resources, informational environment, educational software**

I. Introduction

Nowadays the organization of the modern educational process is carried out through the increasingly active application of electronic learning. That is why the need to develop appropriate electronic educational resources for all educational levels is rising. All software is an intellectual property and it takes a lot of time, effort and resources to develop and that explains the huge deficit in the possibility of using free software for teaching at the various stages of education.

This is also the main reason why, in recent years, the various technologies for learning different materials at school through electronic resources or through dedicated educational electronic platforms have become the main subject of research by specialists in the field.

In pedagogical literature, electronic resources are defined by various terms and concepts such as: educational and pedagogical computer programs, electronic resources for teaching, educational electronic editions, etc.

They are a universal tool for organizing technological learning in the new informational environment. Through them, educational and reference information can be obtained in a variety of forms, the process of knowledge acquisition can be productively organized, skills and habits can be acquired for independent studies or practical activity, and the results of the learning process can be effectively monitored and controlled.

E-learning resources provide the ability to closely monitor the learner's progress and generate a final performance report with notes for improvement. They have a basic and easy installation process that is linked to effective integration with other platforms such as CRM or management tools to provide enhanced learning.

In most cases, they work seamlessly with many other devices, websites and operating systems. For the benefit of their users, most platforms for creating educational resources provide an option for demo tests and exams so that the user can easily determine their level of knowledge of the subject at hand.

Specialists also focus their attention on the application of digital technologies in all educational subjects, as well as the basic possibilities and methodical solutions for using technologies and educational resources, working with tablets and online applications and working with an interactive whiteboard.

II. Electronic educational resources and e-learning

The use of digital learning environments is a logical step in the development of educational systems, since personal computers, smartphones and other electronic devices are widely used in society. The means used for technological support of the learning and teaching process, which are now common in schools are many and varied, such as:

- Distance learning platforms;
- Virtual educational environments (libraries, laboratories, classrooms);
- Virtual and augmented reality in teaching;
- Electronic, mobile and hybrid learning;
- Smartphones, tablets, interactive whiteboards, multimedia systems, etc.;
- Use of social networks in the educational process;
- Cloud technologies, etc.

Their functionality can be complemented and upgraded by the use of appropriate software tools such as: electronic textbooks, platforms for creating, publishing, storing, searching and sharing electronic learning resources, systems for organizing and managing the learning process, etc. In aid of the educational process, the possibilities of providing content, audio and video resources through Internet technologies - social networks, blogs, websites, etc., are also included. With their skillful and expedient use, new methods of learning are developed, traditional ones are improved and more effective pedagogical strategies are created.

Information technology can be a powerful tool for transforming learning. Through its use, the established approaches to learning, teaching and collaboration can be rethought. Modern day teachers must have the necessary knowledge and skills to make full sense of the new technologies used in their work. The reasonable application of modern information technologies is able to qualitatively change the process of educational development. Teaching is now conducted in an environment using the functional capabilities of ICT, i.e. e-learning, for which appropriate didacting materials are also required.

Beetham defines e-learning as ‘learning, supported by the use of information and communication technologies (ICT)’ (Beetham, 2004) [1]. This implies that learning can also be defined as electronic when individual non-networked technologies are used, such as interactive whiteboards, digital video, personal computers and various computer applications. According to Usoro and Abid (2008), e-learning can be defined as learning that is supported or facilitated by electronic means; for this purpose, the Internet is most often used as a method of communication [2].

A special and now very common form of e-learning is the so-called ‘hybrid learning’, which combines two different forms of learning processes. Hybrid learning is a term used to describe a learning process in which e-learning, in its various forms, is combined with the already established traditional forms of learning, such as classroom learning (Stockley, 2011) [3]. Hybrid

learning encourages students to actively learn and participate in a particular scholar discipline and supports the effective use of all available resources in order to build a collaborative culture.

There are three main factors that affect the quality of e-learning in a didactic and pedagogical aspect:

- *Visual perception*. The design of electronic materials should be easy to use. The individual 'units' of the learning material, as well as the individual activities, must be clearly distinguished. 'Units' should also be easy for the students to find, not hidden away in an unlabeled folder. The overview of the course units should be visualized (for example - given in a table or using a figure);
- *Perception of the content of electronic didactic materials*. The teaching material that is to be presented must be well structured and selected in terms of content and volume. The content must also be up-to-date and tailored to the target group for which it is intended.
- *Interface perception*. Platform navigation should be easy and clear (labeled files, folders and forums). Downloads should be open in a new tab and the current e-learning course should be kept on the screen. Links posted on the platform must always be active.

III. Learning objects

The term 'learning object' is used in connection to e-learning. Wiley defines a learning object as 'any digital resource that can be repeatedly used for learning' (Wiley, 2000) [4]. The main characteristic of learning objects is that they are small learning components that can be used repeatedly, i.e. for another task or activity. Therefore a learning object can be defined as 'any digital resource that can be reused to support learning'.

Examples of smaller reusable digital resources include digital images or photos, live feeds, pre-recorded video or audio snippets, small bits of text, animations and smaller web applications.

Examples of larger reusable digital resources include entire web pages that combine text, images and other media.

Wiley (2000) synthesized learning objects into a taxonomy of five categories [4]:

- *Single* - e.g. JPEG image of a hand on top of piano keys;
- *Combined-unchangeable* - e.g. a video with accompanying audio of a hand, playing the piano;
- *Combined-changeable* - a web page that dynamically combines the mentioned image or video together with textual material;
- *Dynamic-presentational* - PHP program code that generates a crossword puzzle and presents it graphically;
- *Dynamic-educational* - an algorithm that simultaneously teaches and provides exercise of a certain knowledge or skill, e.g. an algorithm that generates and graphically presents a crossword with the vocabulary taught in the lesson, with the instructions of the task aimed at practicing the same vocabulary, as the program code of the algorithm checks, gives feedback and an overall assessment of the performance of the learner.

According to Andriotis (2016), learning objects have six distinctive characteristics [5]:

- *Interoperability* - learning objects can be used in various software packages and platforms (Mac, PC);

- *Opportunity for reusability* - a well-planned learning object can fit into multiple different scenarios;
- *Management* - it is necessary to track and update the learning objects;
- *Flexibility* - learning objects must be adaptable to serve the needs of learners and bring them closer to achieving their learning goals;
- *Accessibility* - this distinguishing factor refers to the fact that objects must be accessible online, easily searchable and well categorized to be true learning objects;
- *Durability* - learning objects must stand the test of time in terms of their content and their implementation mechanism.

The correct organization and management of the educational process favors the development of cognitive interests, the construction of positive motives for the educational activity, which, once formed, themselves become effective internal factors for improving its quality and increasing efficiency.

IV. Conclusion

The creation and use of electronic educational resources is becoming increasingly important in modern education. They have the potential to create an interactive and fun learning environment, as they contain activities that meet educational standards, learning objectives, provide feedback and can achieve high educational results. The use of paid educational software in the learning process is a modern and preferred means that increases student motivation and makes learning seamless and attractive. However, this depends on the ability to allocate the necessary funds for the purchase of licenses and technical equipment for the classroom. It is essential for the modern teacher in Bulgaria to know the main characteristics of educational platforms and digital environments, the possibilities for their integration in the learning process, as well as in extracurricular activities, taking into account the age characteristics and the level of knowledge of the students. The use of ICT allows intensification of the learning process, helps to differentiate and individualize it. The implementation of ICT accelerates the transmission of knowledge accumulated not so much from the technological and social experience of humanity from generation to generation, but also from one person to another.

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