



BLENDED LEARNING AS A MEANS OF DEVELOPING THE PROFESSIONAL COMPETENCE OF FUTURE ENGINEERS

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Abstract

The latest advances in science and technology, along with production, have also brought about significant changes in the field of education, the introduction of innovations in the training of future engineers to have the ability to adapt to modern conditions and independently solve professional and life problems. Makes it necessary to teach him a creative approach. Therefore, the development of professional competency of future engineers is an important factor today.

Keywords: Blended learning, e-learning, information technology, future engineer.

Introduction

Nowadays, interest in electronic learning is growing. E-learning occupies a strong place in the modern education system (from the generally accepted term e-learning; in fact, the concepts of "distance learning" and e-learning are not the same, but some interpret them in the same way).

Special attention is paid to new pedagogical models of competence development, continuity of education, assessment of the quality of education, the use of distance learning technologies in the educational process and support for independent learning, [1]. Today, e-learning has become an important component of the modern education system, significantly expanding the capabilities of the traditional education system in accessing and managing educational resources, organizing the management of the educational process using distance learning technologies. E-learning is understood as the organization of educational activities, the interaction of students and teaching staff, the processing of information technologies, technical means, as well as information and telecommunication networks that provide the transmission of this information through communication lines, which are contained in databases and are used in the implementation of educational programs [2].

One of the most optimal ways of teaching using electronic educational resources is blended learning.

The implementation of blended learning requires much more effort and time from the teacher than the usual, centuries-old form of work. The psychological unpreparedness of the teacher, who has turned from a teacher into an assistant, to change his role in





the educational process is also a clear obstacle. The introduction of blended learning as an innovation leads to a number of changes in the self-determination and activities of the student and the teacher. The student finds an environment of freedom and responsibility, in which he learns to make a conscious choice and be responsible for its consequences. The teacher begins to act in new roles for himself, in particular, he moves from the role of an interpreter to the role of an educator, and the main tool of the teacher becomes a learning environment that is a mixture of the classroom environment and the online environment.

Blended learning (English: "Blended Learning") is a combination of traditional forms of face-to-face teaching with electronic educational resources, which uses special information technologies such as computer graphics, video and audio, interactive elements, etc. [3]. The educational process in blended learning is a sequence of traditional and electronic learning stages, which alternate in time (Figure 1). The current stage of development of educational activities is determined by the dominance of information and communication technologies, which allow activating traditional forms and methods of approaches to teaching. An increasing number of people are striving to receive education with minimal loss of time, since the pace of life leaves less and less time for traditional full-time education.



1. Blended learning

There are several reasons for the transition from traditional (face-to-face) and online forms of education to blended learning. In higher education institutions, this is primarily due to the widespread trend towards optimizing business processes at the end of the 20th century.

The development of blended learning is primarily facilitated by the development of information technology through the ability to exchange information via the Internet.





Questions for exams, project assignments, and teaching materials can simply be posted on the platform or sent to students via e-mail.

The development of blended learning is also due to research in the field of modern information technologies, which has been carried out in recent years to develop robotics.

The history of the term "blended learning" dates back to the 1990s, when Interactive Learning Centers began to offer online courses using blended learning methods[3]. However, until 2005-2006, other slightly modified names of this term were given in the specialized literature (hybrid education, blended learning - a guide to blended learning, integrated or web-enhanced learning, blended learning), but the essence of all of them is the same. These terms changed with the publication of the Blended Learning Guide, which gave a very clear definition of blended learning as a combination of face-to-face learning with computer-based learning.

With the development of online technologies, modern teaching technologies are improving, and one of the biggest changes in the educational process is the Blended Learning technology.

Currently, the term "Blended learning" is widely used in the world, and in our country this term has also begun to be used in the educational process.

The word "blended" when translated from English means "mixed, mixed", and this word itself fully expresses the essence of this model. The main feature of this technology is that in it students independently acquire knowledge, using modern information technologies, communicate with their peers and teachers.

The learning process is different from the usual: the student studies some resources on the subject at home with the help of information technology. But we do not consider this to be distance learning. Because there is almost no help from the teacher to master the subject, the teacher can provide materials and assignments on the subject. Moreover, this is not individual learning on a computer: the student must be part of a group and work together with group members.

Many teachers offer innovative teaching methods that can provide the necessary support and resources to ensure a comprehensive, evidence-based approach to blended learning, including any form of blended learning, educational commitment, as well as a plan. Scholars such as Graham, Woodfield and Harrison argue that "simply using the Internet or technology in some way does not mean blended learning."

As information technology advances, teachers and students have access to a shared online environment that they can use. This allows teachers to communicate with students, share knowledge, ask questions, access learning resources, and organize and manage online activities that are fully online - accessible to any internet user. There





are many digital resources available for use in education. These include educational videos, interactive learning games, and programs that allow students to present videos, animations, web pages, music, and more. All of these help to engage students and work independently. Some of the important and pedagogical aspects of blended learning are that it stimulates student interest in the lessons, encourages students to learn more deeply, and also makes them more inspired, active, and engaged with technology. Blended learning has been shown to be more effective than online-only learning. Students prefer these learning methods to traditional methods, and blended learning is an effective way to develop students' critical thinking skills.

There are many factors to consider when choosing how to combine traditional teaching and in-person online learning. In some cases, the interaction between students and the teacher, as well as the direct delivery of lessons, takes place in the classroom, with resources and some additional information delivered online. In other cases, most of the training takes place online, with frequent meetings to support problem-solving and community building.

Chinese scholar Jia Zhang defines blended learning as “a descriptive method used to clearly demonstrate the blended learning process and clarify each learning process.”

There are several blended learning modes, including skill-based mode, relational mode, ability-based mode, and “Bamum and Panmalm” mode.

Skill-based mode combines student self-study with online guidance from a teacher, where students and teachers interact primarily through email and online forums.

Relational mode is a combination of traditional classroom teaching and online collaborative learning, which explains the content, properties, expected outcomes of face-to-face collaborative learning, as well as issues related to how to adopt network technologies.

Competency-based mode is a mode in which students and experts work together and interact online to acquire knowledge. Decision-making should be based on basic facts and working principles, and should also be supported by the knowledge acquired by experts.

Competency mode is a blended learning mode that is suitable for learning knowledge. The current state of online independent learning among technical universities in the blended learning mode was studied and analyzed.

The “Bamum and Panmalm” mode includes four stages: Internet-based transfer of educational materials, face-to-face work, the formation of specific products and cooperative extended learning. Teachers and students can design and formulate a special blended learning plan based on the requirements of the curriculum and the combination of teaching experience.





At the request of the US Department of State Education, experts from Stanford University analyzed more than a thousand studies on traditional, online and blended learning. According to the results of the analysis, the authors noted that online learning did not have a significant advantage over traditional forms of education in the period from 1996 to 2008. However, it has been proven that learning in blended learning is significantly more effective. Therefore, in our research, we want to propose both offline and online learning processes using e-learning tools. This research significantly strengthens the position of blended learning and gives further impetus to its development.

The American magazine “Its Learning” lists the following advantages of teaching using Blended Learning technology:

1. **Effective use of class time.** Blended learning technology allows teachers to make the most of the time they have with their students. By moving traditional classroom activities to the online world, you can spend less time talking in front of the class and more time working with students individually. Research by Professor John Hattie of the University of Auckland shows that one of the keys to successful learning is the time spent talking with the teacher and improving the relationship between students and teachers.
2. **Differentiated tasks.** If more time is needed for individual work with students in the classroom, the teacher gives tasks based on the capabilities and level of knowledge of each student. Many online resources also automatically differ from each other: for example, the more correctly a student answers, the more difficult the math exercises can be.
3. **Active students.** Unlike traditional educational technologies, “Blended learning” uses online videos and electronic resources to prepare students before coming to class. Thus, students come to class knowing theoretical information, and the main focus of the lesson is on applying this theory to life, that is, forming students’ competence in the subject. In this model, the subject teacher acts as a leader and mentor. It is also possible to assess the work done by students before the lesson - so the teacher knows exactly what information is needed for the students. This is related to another conclusion of John Hattie: 50% of what is taught in the lesson is known to students before the lesson.
4. **Creativity.** There are thousands of online resources that allow students to create videos, animations, new media files. This opens up new ways for students to work independently and apply what they have learned in practice. Students can also do additional reading and assignments online to help them understand the subject without wasting valuable class time.





5. Student preparation. When students are prepared online in advance (for example, in a carefully designed lesson model), students are better prepared for the lesson. This means that students are engaged in more of the subject matter.

6. Teaching 21st century skills. Today's students need to learn to work online, share information. They also need to develop the critical thinking and creative skills that modern employers demand. Blended learning technology helps students develop these skills by encouraging students to work online, share information, and collaborate.

7. Moving away from paper work. Almost all teachers' desks are full of assigned work documents and papers with students' tests to be checked and completed assignments. Grades should be recorded in students' notebooks. Online learning platforms digitize many assignments, so the necessary marking can be done online (in an educational institution or at home).

In addition, it is possible to take students' tests and independent work online and submit grades automatically.

8. All learning resources in one place. Online resources can be accessed from any computer with an Internet connection. This means that we only need to upload a video, website link, newspaper article, or other resource once. We and our students, as well as other teachers, will have access to it not only from computers with an Internet connection, but also from mobile devices.

9. Cost reduction. Although the installation of information and communication technologies necessary for the implementation of blended learning may require some initial investment, many schools and academic lyceums will reduce overall costs due to the reduction in textbooks, paper and photocopying costs.

The factors listed above have led to the emergence of a separate sector in the field of e-learning with its own tasks and specialists in the creation and use of blended learning systems. Undoubtedly, the effectiveness of blended learning depends, first of all, on the correct definition of e-learning goals and the ability to achieve these goals using a specific e-learning system. Clearly set goals can be based on learning theory.

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