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## **E-LEARNING AS A GLOBAL TREND IN EDUCATION IN 21 CENTURY**

### **ЭЛЕКТРОННОЕ ОБУЧЕНИЕ КАК ГЛОБАЛЬНЫЙ ТРЕНД ОБРАЗОВАНИЯ 21 ВЕКА**

E-learning has become a global trend in education in the 21st century. The rapid advancement of technology moved traditional methods of learning to online platforms and digital tools. This article describes current and perspective e-learning models which revolutionize the modern education.

Электронное обучение стало глобальной тенденцией в образовании 21 века. Стремительное развитие информационных технологий переместило традиционные методы обучения на онлайн-платформы и цифровые инструменты. В этой статье описываются текущие и перспективные модели электронного обучения, которые революционизируют современное образование.

**Key words:** e-learning, digital environment

Ключевые слова: электронное обучение, цифровая среда

The concept of “e-learning” has come into everyday and scientific circulation relatively recently (the end of the 60s of the XX century) due to the rapid scientific and technological progress. According to the definition of the European Commission – e-learning is: “the use of new multimedia and Internet technologies to improve the quality of training by improving access to resources and services, as well as remote knowledge sharing and collaboration”.

In Belarus e-learning is considered as “a development-oriented and self-realization approach for students to use multimedia technologies and the Internet to improve the quality of education by facilitating access to resources and services, as well as to remote information exchange and interaction”.

In Russia e-learning is described as: the organization of educational activities using the digital technologies, technical means, as well as different kinds of networks that ensure the transmission of information during the interaction of students and teachers.

Western researchers have also looked at e-learning in this context. E-learning was defined as a learning activity that is carried out mainly through the use of telecommunication technologies such as e-mail, learning management systems, chat rooms, video conferencing services and the Internet. E-learning is also seen as using the Internet to access educational materials; interaction with content, instructor (teacher) and students; receiving support in the learning process, for mastering knowledge, building personal meaning and forming learning experience, ensuring the effectiveness of the educational process.

As can be seen from the presented examples, this phenomenon seems to be much broader and more extensive than just as a process of "delivery" of information and interaction based on ICT (information-communication technologies). In addition to using various telecommunication means for access, e-learning mention is made of the organization of training, and communication with the teacher to obtain support, and the formation of individual learning experience.

Researchers note that over the past 50 years there has been a transformation of learning under the influence of ICT, in which several stages have already successively changed:

- the stage of introducing a computer as a didactic tool, aimed mainly at strengthening the principle of visibility;
- the stage of expanded use of ICT, additionally performing the functions of individualization and differentiation of education;
- the stage of implementation of ICT at all stages of training (design, implementation, control and correction), the result of which was the formation of distance learning as a new type [1].

In the course of evolution, the initial essential characteristics of the concept of “e-learning” were formulated on the basis of instrumental and technological functions

– means of delivering educational content and interaction using various electronic devices and telecommunications.

In line with these characteristics, over the past 30 years, a number of concepts have emerged that have appeared in foreign and Russian-language studies: electronic, computer, remote (e-learning), mobile (m-learning), universal education (u-learning), blended learning.

These concepts are specific in relation to the concept of “e-learning” from the point of view of performing functions by various means for accessing educational information and organizing forms of interaction. In this context, e-learning, as a generalized concept, is understood as the learning process using various software and hardware and telecommunications for the network-based organization of interaction between the subjects of the educational process.

E-learning models are constantly evolving, but a number of models have become the most common in the educational practice of modern pedagogy. Depending on the leading type of computer device and the method of transmitting information when organizing pedagogical interaction, several main models of e-learning can be distinguished:

- computer training - guided training and self-study with the predominant use of computers (stationary) and certain educational software;
- distance learning - controlled learning and self-learning remotely using software and hardware and telecommunications to access educational content;
- mobile learning - controlled interactive learning and self-learning anytime, anywhere using personal portable computer devices.
- online training - training organized on the basis of synchronous telecommunication facilities and online services (platforms) [2].

The advantages and disadvantages of e-learning are constantly discussed by researchers and include different opinions regarding the organization of the educational process, the communication possibilities with students, assessment of educational activities in digital environment, motivation of cognitive activity, preservation health. However, every year the practice of e-learning becomes wider and more widespread and today there is a discussion of e-learning as a separate, sufficiently profitable sector of educational services in the world. The recent outbreak of the COVID-19 pandemic at the global level has also tremendously boosted the e-learning industry growth due to the restriction of visits to educational institutes.

According to the researches [3-5] the global e-learning services market size was estimated at USD 299.67 billion in 2024 and is expected to grow at 19.0% from 2025 to 2030. This rapid growth is driven by increased adoption of digital learning platforms across educational institutions and corporate sectors, fueled by demand for remote learning and upskilling opportunities.

The main factors of e-learning market growth are:

- increasing focus on lifelong learning and professional development? especially in corporate education;
- rising popularity of microlearning and subscription-based models which makes e-learning accessible and cost-effective for individuals and organizations;
- rising the offers of hybrid and distance-learning programs in higher education;
- growing availability of mobile-based learning apps for modern learners;
- widespread adoption of AI and data analytics which enables adaptive learning solutions that personalize content to individual needs;
- integrating in e-learning platforms tools such as augmented and virtual reality (AR/VR) to offer immersive learning experiences, enhancing comprehension and engagement;
- government regulatory support promoting digital literacy and training programs.

The trends in the development of e-learning courses can be divided into three groups:

- instructor-led virtual courses are the most popular and accounted for the largest market revenue share in 2024. These type of courses allow learners to engage with instructors through live sessions, discussions, fostering better comprehension and engagement;
- self-paced courses segment are also significant grow due to the flexibility it offers learners to study at their own convenience and pace. Organizations increasingly adopt self-paced courses to provide on-demand training resources. The growing availability of online platforms offering affordable or even free courses move this e-learning model to the top of popularity;
- video games as learning tools has become an effective tool that generates engagement and improves test scores among students. Gamification helps learning by catering to a person's competitive nature.

The most popular technologies for e-learning today are:

- the cloud computing, which held the largest market revenue share in 2024 due to its ability to offer scalable, flexible, and cost-efficient infrastructure for e-learning services;
- the artificial intelligence (AI) is poised for significant market growth due to its ability to deliver personalized and adaptive learning experiences;
- mobile learning, where mobile devices have become the default for more people compared to desktops and laptops and mobile internet has taken up 52% of total web traffic worldwide.

In conclusion, e-learning has given education a new dimension. With the advancement of technology, traditional methods of learning have been transformed into a more modern and convenient approach. It has broken down barriers and provided



a convenient, interactive, and affordable way of learning. As technology continues to advance, we can only expect e-learning to continue to evolve and enhance the educational possibilities for students worldwide.

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### **РЕАЛИЗАЦИЯ ПРОЕКТНОЙ ДЕЯТЕЛЬНОСТИ НА ЗАНЯТИЯХ ПО ОБРАЗОВАТЕЛЬНОЙ РОБОТОТЕХНИКЕ НА ПРИМЕРЕ ПРОЕКТА «ВИКТОРИНА»**

#### **IMPLEMENTATION OF PROJECT ACTIVITIES IN EDUCATIONAL ROBOTICS CLASSES USING THE EXAMPLE OF THE QUIZ PROJECT**

Проектная деятельность на факультативных занятиях по робототехнике становится всё более популярной в образовательных учреждениях Беларуси. В рамках государственной программы «Образование и молодежная политика» школы получили 150 комплектов робототехнического оборудования, что способствует внедрению STEM-подходов. Факультативные занятия по робототехнике развивают у учащихся творческие и технические способности, навыки командной работы и критическое мышление. Проектная деятельность позволяет применять теоретические знания на практике, создавая уникальные продукты. Примером является проект викторины, реализуемый с помощью комплектов Robbo и программного обеспечения Scratch. Такой подход повышает мотивацию учащихся и готовит их к будущей профессиональной деятельности в инженерной сфере.