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THE ROLE OF ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN INCREASING THE QUALITY OF DIGITAL TEXTBOOKS

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Abstract
In this article, the application and capabilities of artificial intelligence technologies in digital textbooks in the teaching of the programming science were analyzed. The role, significance, and opportunities of quality digital textbooks in students' mastery of the programming science, as well as the possibilities of applying artificial intelligence technologies in the preparation of quality digital textbooks, and the use of chatbots therein, are brought forward.

Keywords: Modern information technologies, artificial intelligence, digitalization, digital textbook, independent education, electronic information resources, websites, web technologies, chatbot.

Introduction

Today, the modernization of the education system in our country, the widespread introduction of digital technologies into all spheres, and the development of future specialists' competencies for the effective use of information and communication technologies are considered one of the priority directions of state policy. The large-scale reforms implemented in the political and socio-economic spheres of our Republic are necessitating the training of competitive and innovatively thinking personnel possessing modern knowledge and skills.

From this point of view, increasing students' literacy in using computer and internet technologies, teaching the basics of programming, and forming skills for the conscious and effective use of information technologies are considered one of the urgent tasks. In the implementation of these tasks, the role of digital educational resources, particularly digital textbooks, is incomparable. Unlike traditional educational literature, digital textbooks increase the efficiency of learners' knowledge

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acquisition through the integration of text, graphics, audio, video, animation, and interactive elements.

The organization of educational processes on the basis of blended learning utilizing digital textbooks expands students' opportunities for independent education, develops their logical and algorithmic thinking abilities, and wide opportunities are created for mastering educational materials at individual paces. In the teaching of the programming science, digital textbooks enriched with interactive tasks, virtual laboratories, testing systems, and thematic conversation modules help to increase students' interest in the subject and to develop and strengthen their practical skills.

Furthermore, digital textbooks create opportunities for the effective organization of distance and blended forms of education, ensuring the continuity of the educational process, and systematically updating learning materials. As a result, the quality of education is increased, and necessary pedagogical conditions are created for the training of qualified specialists who meet the demands of the modern information society. Therefore, improving the pedagogical, methodical, and technological foundations of utilizing digital textbooks in the teaching of information technologies and programming-related sciences, expanding their interactive capabilities, and their effective integration into the educational process are considered one of the urgent directions of scientific research today.

It is widely acknowledged that digital textbooks are currently considered one of the primary sources for mastering theoretical and practical knowledge in a subject. Furthermore, they serve as an important pedagogical tool in developing students' intellectual potential, forming independent learning competencies, increasing the culture of working with information technologies, and elevating the level of professional training. Modern digital textbooks fundamentally differ from traditional textbooks by incorporating multimedia elements, interactive tasks, virtual laboratories, testing systems, and communication modules alongside textual information.

Numerous scientific studies have been conducted on the creation of digital textbooks based on modern digital technologies and their effective implementation into the educational process. In regards to the design of learning materials, the scientific research of such scholars as V.P. Bespalko, A.A. Verbitsky, N.A. Galatenko, Y.I. Dik, V.K. Dyachenko, I.I. Ilyasov, I.Y. Lerner, Y.S. Tyunnikov, and L.S. Khizhnyakova has been reviewed. The ideas of applying new information technologies in modern

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digital textbooks were formed on the basis of the psychological theory of educational activity, and in this direction, the scientific insights of leading scientists such as L.S. Vygotsky, P.Ya. Galperin, A.N. Leontiev, N.A. Menchinskaya, S.L. Rubinstein, N.F. Talyzina, and D.B. Elkonin were examined. Furthermore, the pedagogical potential of electronic educational resources, the impact of multimedia technologies on knowledge acquisition, and the advantages of an interactive learning environment have been scientifically substantiated by other researchers. In their studies, it has been emphasized that the utilization of digital educational resources increases students' motivation, assists in the firm mastery of knowledge, and develops independent thinking skills.

A number of scientific investigations are also being conducted by the scientists of our country on the creation of digital educational resources, electronic textbooks, and interactive learning systems. In these studies, particular attention has been focused on the issues of increasing the quality of education, developing learners' information and communication competencies, and effectively utilizing modern pedagogical and information technologies in teaching subjects.

At the same time, the necessity for further developing scientific research on improving digital textbooks designed for teaching programming sciences, and enriching them with artificial intelligence technologies, interactive conversation modules, and adaptive learning mechanisms, remains persistent.

Today, in the process of the digital transformation of the education system, artificial intelligence (Artificial Intelligence – AI) technologies are occupying an important place. Especially, the implementation of AI technologies in the creation and utilization of digital textbooks serves to increase the quality of education, individualize the educational process, and enhance the efficiency of students' knowledge acquisition. The utilizing of artificial intelligence capabilities in digital textbooks is capable of presenting learning materials in an adapted form by analyzing students' knowledge levels, interests, and paces of mastery. Such an approach assists in acquiring education by taking into account the individual needs of each learner. Interactive communication is also provided by AI technologies in digital textbooks. Virtual assistants and chatbots create the opportunity to give prompt answers to learners' questions, explain complex topics, and support the independent education process. As a result, an effective two-way communication is formed between the student and the digital educational resource.

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Furthermore, the possibility of monitoring learners' activities, assessing, and analyzing knowledge is also provided by artificial intelligence. Detailed information regarding the strong and weak sides of a learner is prepared for the teacher by AI algorithms through the analysis of test results and educational activities. This, in turn, assists in organizing the educational process in a more effective manner.

The application of AI technologies in digital textbooks also expands capabilities such as the automatic creation of multimedia elements, text analysis, translation, speech recognition, and synthesis. As a result, educational materials are made more interesting, understandable, and convenient for utilization.

Based on the recommendations presented above, as well as the results of multi-year scientific research and conducted analyses, a digital textbook on the subject of "Programming" and its supporting educational platform https://selfedu.uz/ were created. Within this platform, a special chatbot has been developed utilizing artificial intelligence technologies. This chatbot provides students with the opportunity to receive prompt answers at any time to questions that arise during the process of mastering the topics. The primary advantage of the chatbot is that it analyzes the learning materials within the digital textbook and responds to students' inquiries based precisely on these sources. As a result, users are enabled to master the topics more deeply, clarify complex concepts, and effectively solve problems encountered during the independent education process.

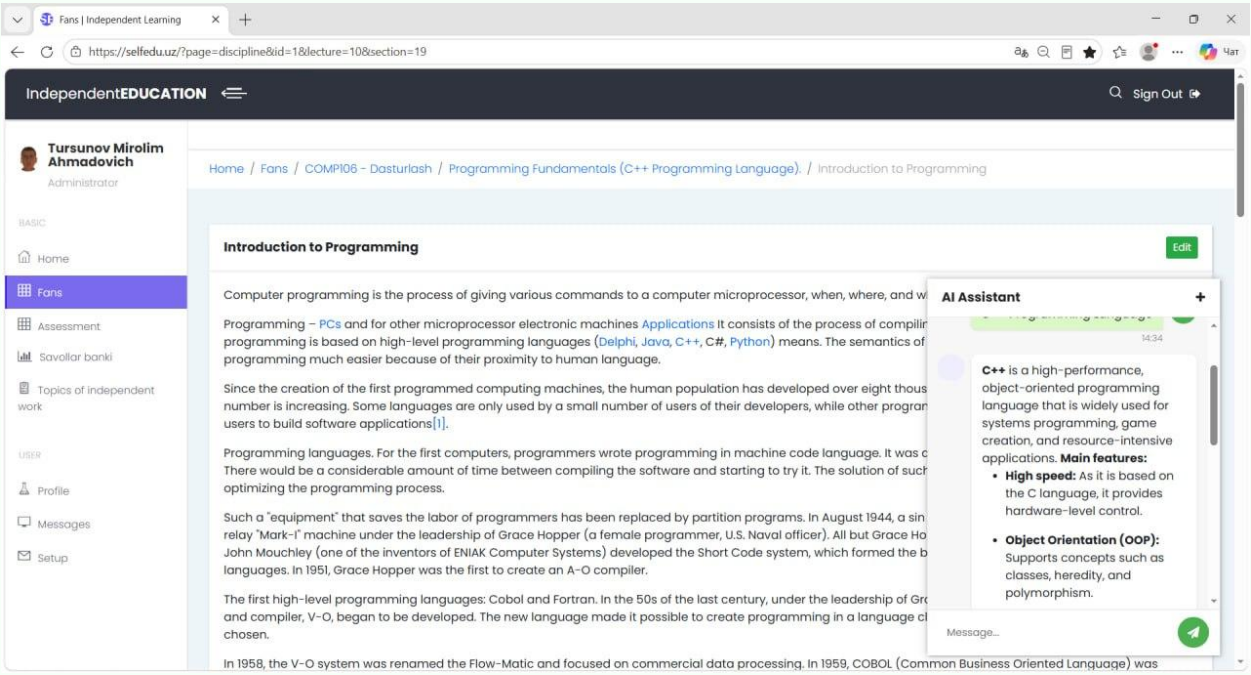

Figure 1. View of the chatbot on the https://selfedu.uz/ educational platform.

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The chatbot on this educational platform serves to support students' independent educational activities, increase the efficiency of working with learning materials, and organize the educational process in an interactive form. The integration of artificial intelligence technologies into the digital textbook expands the functional capabilities of the educational resource, and the learning process of students is assisted to be organized in a more convenient and effective manner.

In conclusion, the created digital textbook serves to strengthen students' theoretical knowledge, develop their practical skills, and effectively organize their independent educational activities. The interactive structure of the digital textbook creates an opportunity for mastering learning materials in a convenient and understandable form, and a positive impact is exerted on the development of students' intellectual potential. Furthermore, the integration of modern information and communication technologies and artificial intelligence capabilities within it increases the efficiency of the educational process. In particular, the AI-based chatbot implemented into the platform provides prompt and well-founded answers to students' questions arising from the topics, thereby ensuring the continuity of the educational process. As a result, users are enabled to independently overcome difficulties encountered in mastery, deepen their knowledge, and effectively solve practical problems. This digital educational resource serves to increase the quality of teaching programming sciences in the future, develop students' professional competencies, and improve the digital educational environment.

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