Application of Artificial Intelligence in E-Learning

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Abstract: The article examines the control and evaluation of students' knowledge, with the aim of determining and analyzing the mistakes made and their prevention in order to achieve a better education. The role of electronic tests as a preferred and applied means of knowledge assessment is shown. Emphasis is placed on the application of artificial intelligence as an assistant to the learner for the rapid elimination of gaps and assimilation of knowledge, when weaker results are reported on electronic tests in a given academic discipline.

Keywords: electronic learning, electronic test, artificial intelligence, learner.

I. INTRODUCTION

In modern society, an important part and main task is the education of the younger generation. The education of young people plays a key role, since the good future of a country depends on their fruitful and comprehensive development and realization.

Education remains a fundamental activity in society, but with the rapid development of information technology and models, it is also changing and developing [18, 19, 20, 22, 23]. Traditional synchronous school teaching is increasingly using asynchronous and e-learning not only as a support activity for learning the material, but also becoming the main way of learning.

In the learning process, an important factor is the assessment and control of knowledge. They assist in determining the level of knowledge of the students and determining the nature of the mistakes they made with the aim of better education and achieving maximum results [1], [2].

II. MATERIALS AND METHODS

The report describes the digital technologies used and their application methods to achieve better results in education. Information from the global information environment was used, analyzing and predicting the role of digital tests for assessing students' knowledge and the capabilities of artificial intelligence as an assistant to learners. Various AI chat platforms are explored and presented. An approach to working with the ChatGPT platform was used, which included the preparation of specific questions, analysis of the received information and assessment of its reliability, credibility and relevance. Examples generated by the chat platform ChatGPT are presented.

One of the preferred and applied means of knowledge assessment are electronic tests. They ensure objectivity, reliability and validity of the assessment. Tests serve as a guide and determine the speed of learning and the level of complexity of the material in the further teaching of knowledge [3].

When considering the results of the conducted electronic tests, some of the obtained grades are weaker. Based on the assessment and the errors received, guidelines are outlined for improving the knowledge of the studied subject. In case of lower test results, the student must read and learn a large volume of studied material from a taught discipline in a relatively short time. For the quick removal of gaps and assimilation of knowledge, students can use the possibilities and applications of artificial intelligence.

Artificial intelligence is the intelligence of computers used to solve complex tasks over large volumes of data. The concept of technology and its beginning was put forward in the 50s of the last century by Alan Turing. The operation and functions of artificial intelligence have developed very rapidly in recent years, due to the increase in processor power, the use of new algorithms and the creation of large data sets [21].

Print ISSN 1691-5402
Online ISSN 2256-070X
https://doi.org/10.17770/etr2024vol2.8053
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In the modern world, AI is much more than computers, it is present to an ever greater extent and in more areas of our lives. Its applications are in the field of medicine - diagnosis and prediction, transportation - self-driving cars, advertising - personalized advertising campaigns, language assistants, voice translations and others [4], [5]. Undoubtedly, one of the commonly used functions of AI is in the field of learning. Teachers use it to draw up topic plans, create electronic materials, brief summaries of books, while learners use its capabilities to search for information on topics, self-study in various disciplines, help in creating content on a given topic [6], [7].

In case of lower test scores, learners can use some of the AI platforms to improve their knowledge. AI chat platforms with the largest number of users are ChatGPT - a large language model trained for dialogue [8], Bard - a chatbot created by Google, which was renamed Genimi in early 2024. Genimi fixes Bard's shortcomings and is upgraded with additional possibilities [9]. Other widely used chat platforms are Bing Chat – integrates ChatGPT into Bing[10] and Claude – a generative Chatbot at the level of ChatGPT, available for US and UK and via VPN from other countries [11], [12], [13].

The principle of operation and the role of created AI platforms are to work in dialogue. ChatGPT can help student learning in many ways by turning it into a personal assistant.

Identifying knowledge gaps. The AI can analyze the data from the assessments, solved tasks and exercises of the learner and generate a diagnostic assessment of the level of knowledge acquired in a certain subject.

Personalized virtual training. Learners understand and learn material differently, using different working and learning styles and absorbing material at a slower or faster pace. Artificial intelligence has the ability to analyze large amounts of data and build a model for personalized learning of each learner [8], [14], [15], [16], [17].

Help with self-preparation. Learning by asking questions about a specific topic Fig. 1. Questions should be clear and precise.

A sample discussion for C#:
https://chat.openai.com/c/1226b333-1e32-4f74-93ea-ae7a7ad41daa.

Many additional questions can be asked on the same topic for more details Fig. 2.

Generate practice exercises and assignments on a selected topic. It is best to study material on a given topic by solving practical exercises. ChatGPT can create assignments and exercises by topic. AI can generate task conditions, instructions for solving them and the solution of the set tasks itself [8], [14], [15], [16] Fig. 3.
Fig. 3. Generated task by GhatGPT.

**Test preparation.** Self-study assistance by generating a quiz on a given topic or typed content Fig 4.

Fig. 4. Quiz on a given topic or typed content.

AI can give directions to solve the test and post the correct answers [8], [16], [17] Fig. 5.

Fig. 5. AI to solve the test.

**Generating feedback to learners.** AI analyzes the learner's work through his achievements and with the help and means of applied machine learning algorithms returns the analyzed result [8], [15], [16], [17].

### III. RESULTS AND DISCUSSION

The online test to assess the level of knowledge and the application of ChatGPT AI chat platforms was carried out in 44 Secondary School - Sofia in the 2023/2024 academic year in the 12th grade. Specific questions were prepared, the information received was analyzed and evaluated, and an assessment was made of the relevance and credibility of the material received from ChatGPT.

From the work of the students in AI chat platforms ChatGPT and the observations made, it is concluded that the students learn to ask questions correctly, evaluate the received information accurately and correctly, and have an interest in using the digital environment. Students report that they manage to find accurate and correct information without wasting much time.

### IV. CONCLUSIONS

The possibilities for providing help and support to learners through AI are numerous. They can use them purposefully in their learning by asking the right questions and critically and intelligently evaluating the information received.

The ChatGPT platform demonstrates to us the effectiveness of technological innovation in the educational process. AI chat platforms have a clear strategy and potential to be upgraded and offer more opportunities, providing an innovative solution to enhance the learning material in education and maintain its role as a student's assistant.
ACKNOWLEDGEMENTS

This work was supported by the National Science Program “Security and Defence” program, which has received funding from the Ministry of Education and Science of the Republic of Bulgaria under the grant agreement no. Д01-74/19.05.2022.

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