

APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE INTRODUCTION OF STUDENTS WITH SPECIAL EDUCATIONAL NEEDS TO THE NATURAL AND SOCIAL ENVIRONMENT

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Abstract: The article is an attempt to establish the capabilities of artificial intelligence in familiarizing students with special educational needs with the natural and social environment. The need for inclusive education and ensuring equal access to education for each student, regardless of their characteristics and needs, make the researched issue relevant. The analysis highlights specific applications based on artificial intelligence that support the active participation of students, enrich their sensory-cognitive experience and create a supportive educational environment. Emphasis is placed on the potential of technologies based on artificial intelligence for individualization of the learning process and adaptation of the educational content to the leading learning style of students - auditory, visual and kinesthetic/tactile. Applications based on artificial intelligence that convert text to speech, tools for generating images, interactive simulations and virtual walks are indicated. It is emphasized that tools based on artificial intelligence contribute to a very high degree to the individualization of learning, which help students with special educational needs to learn at their own pace, according to their individual needs and ensure overcoming barriers related to cognitive, sensory or motor difficulties. On the other hand, the integration of artificial intelligence in the education of students with special educational needs supports the development of their teamwork skills, their social skills. The study emphasizes the role of artificial intelligence as an innovative tool for promoting student motivation and activity, for increasing the effectiveness of the learning process in familiarizing students with the natural and social environment. Prospects for future empirical research are outlined, aimed at practical application of the established applications based on artificial intelligence and assessment of their role in the education of students with special educational needs for familiarization with the natural and social environment.

Keywords: local history, man and society, man and nature, inclusive education

1. INTRODUCTION

Modern education has the main task of ensuring equal access to quality education for all students, including students with special educational needs (SEN). In the Bulgarian educational space, children with SEN are integrated into mainstream schools and their inclusion in the classroom is of utmost importance for both their personal development and their future social integration in society. For each child, according to their individual needs, the system of preschool and school education provides an appropriate physical, psychological and social environment for the development of their abilities and skills. (Regulation on Inclusive Education, 2017).

The introduction of young students to the natural and social environment aims to enrich their sensory-cognitive experience, master integral knowledge and develop skills related to the natural and social environment close to them. It is important to build in them basic knowledge about the world around them - natural processes and phenomena, living organisms, social relations, cultural norms and social roles (MES, Curriculum). For students with SEN, this process is often difficult due to cognitive, sensory, communicative or behavioral characteristics, which necessitates the application of individualized and adaptive teaching methods.

For the quality education of each child with SEN, a functional assessment of needs, based on the International Classification of Functioning (ICF-CY), is of particular importance. The biopsychosocial model adopted by the World Health Organization in 2002 views functioning as an interaction between health status and environmental factors (World Health Organization, 2018).

It is important for the teacher to know the way the child learns in order to adapt the methods and means of teaching to the student's main learning style: auditory, visual or kinesthetic/tactile. Although these styles are often mixed, usually one is dominant (Matanova & Todorova, 2013).

Familiarization with the natural and social environment and education about man and nature "of students with intellectual disabilities is an exceptional challenge, for which it is necessary to constantly seek new and good practices" (Zamfirov, 2012, p. 48).

In this context, artificial intelligence (AI) brings enormous potential to the educational process through the possibilities for innovation in teaching and learning, establishing itself as an innovative tool that can significantly support the learning and socialization process of every child, regardless of their abilities and interests. It is no coincidence that researchers are focusing their creative efforts on using its capacity for teaching and mastering diverse learning content (Georgieva, 2025). The benefits of applying AI in the educational process can be enormous,

related to the possibilities for accessible, personalized and adaptive learning, increasing engagement and tailored to the different needs of modern students, and enormous support for teachers (Milićević, Lazarova & Pavlović, 2024). „The application of artificial intelligence in education increases student engagement, but the long-term effects on student knowledge and skills are yet to be analyzed“ (Tsankov & Damyanov, 2025, p. 3641).

AI-based platforms provide opportunities to assist teachers in creating educational resources and can be considered as a tool for increasing the quality/efficiency of the educational process (Neykova, 2025).

The research aims to identify AI applications/systems/technologies that would increase the effectiveness of learning by introducing students with SEN to the natural and social environment.

To achieve the goal, analytical methods are used to identify the capabilities of a number of AI applications/systems/technologies and evaluate their effectiveness on the learning process of students with SEN.

2. POSSIBILITIES OF ARTIFICIAL INTELLIGENCE IN THE EDUCATION OF STUDENTS WITH SEN

AI is entering all spheres of life and especially intensively in the educational space. With its integration into social and natural science education, AI provides immense opportunities for all participants in the educational process – both teachers and students (Chiu, 2024). It provides educators with the opportunity to organize a more effective educational process by tracking progress and providing timely support to each learner (Kasneci, 2023). It can also be a valuable tool for creating educational content tailored to the individual educational needs of the student. This “would encourage more effective and engaging learning, taking into account the different learning styles and rates of development of students” (Kozhukharova & Kozhukharov, 2024, p. 518)

According to the individual needs and basic learning style of each student, AI provides opportunities for personalizing learning content through intelligent educational platforms, interactive applications and adaptive learning systems.

For students with a dominant auditory learning style who prefer to hear information, its traditional, lecture presentation can be enriched through a number of AI systems and technologies, such as the so-called Text-to-Speech or TTS:

- TTSMaker
- SpeechLab
- GSpeech
- Speechify – чете и сниман текст
- Google Gemini Storybook

AI applications are suitable for learning about the natural and social environment because algorithms convert written text, and in some applications (e.g. *Speechify*) and photographed text, into audio that sounds like a real voice. In some applications, intonation and different characteristics of the voice can be added, making it especially pleasant for young students. *Google Gemini Storybook* is a feature in the *Gemini* application that creates personalized stories with illustrations and verbalization of the text. In addition to ready-made text provided to them, the applications can also create text on a given topic, in accordance with set criteria, according to the educational goals and needs of the students.

For students with a dominant visual learning style, it is most appropriate to see, read, and draw. For them, the visual presentation of information is important, which is fundamental in learning about the natural and social environment (Petrova, 2005). Increasingly, AI applications can generate images:

- ChatGPT (OpenAI)
- Gemini
- Gamma.app
- Canva AI
- Copilot

The attitude towards one of the most widely used applications ChatGPT (Kiryakova & Angelova, 2023), the opportunities and risks of its application in education are the subject of numerous analyses (Ipek et al., 2023). Practical and highly effective is its ability to convert a photo/image into a coloring sheet. The process is qualitative and very fast through the command: "Convert image/photo into coloring sheet" and uploading/providing the photo. Very quickly the image (figure 1a) can be downloaded as a coloring sheet file (figure 1b).

Fig. 1a: Picture "Rose"



Source: Author research

Fig. 1b: Coloring sheet "Rose"



Source: ChatGPT

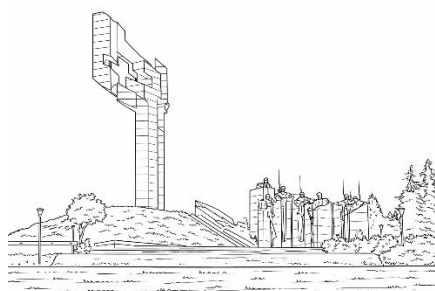
Coloring sheets can be created for both objects from the natural environment and objects from the public environment (Fig. 2a and Fig. 2b).

Fig. 2a Photo "Defenders of Stara Zagora"



Source: <https://bg.wikipedia.org/>

Fig. 2b Coloring Sheet "Defenders of Stara Zagora"



Source: ChatGPT

For students with a dominant kinesthetic/tactile learning style, it is important to participate in the learning process with their hands, with their whole body. For these students, it is important to perform activities that actively involve them, such as practical exercises, experiments. Suitable AI applications are:

- PhET Interactive Simulations – creates free interactive simulations based on educational research and engages students through an intuitive, game-like environment in which students learn through exploration, discovery (<https://phet.colorado.edu/>).
- Labster – enables virtual laboratory experiments (<https://www.labster.com/>).
- Nearpod – an interactive learning platform that supports active and engaging learning. Students have the opportunity to write, move objects on the screen, check their knowledge (<https://nearpod.com/>).

Among the main advantages of using AI to introduce students with SEN to the natural and social environment is the possibility of individualizing learning and active participation of students in the learning process.

The *Study mode* can turn ChatGPT into an individual teacher for each child. It explains the steps needed to reach the final answer. It can adapt to the learning style and monitor the progress of the learner, supporting the learning process by creating flashcards. Thus, it is a valuable assistant for individualization in learning and a very suitable tool in the education of students with SEN.

When learning about the natural environment, AI can be used through virtual nature walks, 3D models of plants and animals, and interactive simulations of natural processes (AI World Builder; Stable Diffusion 3D). This is especially useful for students with sensory or motor disabilities who cannot always fully participate in real-life observations and excursions. Through AI, they are given the opportunity to explore nature in an accessible and safe way for them. AI enables students with SEN to develop their social skills, work in a team, and learn social rules and norms in a supportive learning environment, while simultaneously introducing them to the natural and social environment. This develops their confidence and contributes to their better social adaptation.

The practical application and results of an empirical study of the capabilities of AI tools for familiarizing students with SEN with the natural and social environment identified in this theoretical review would be the subject of a subsequent publication.

3.CONCLUSION

The study shows that artificial intelligence has significant potential to increase the effectiveness of the learning process when introducing students with special educational needs to the natural and social environment. It represents a valuable resource for inclusive education with the possibility of individualization, tailored to the needs of each student and ensuring their active participation in the learning process. The correct and responsible use of AI tools can support not only the acquisition of knowledge, but also the independence, confidence of students with SEN, their social development, which will prepare them for a fuller participation in society.

NOTES

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Проект PhET Interactive Simulations на University of Colorado Boulder <https://phet.colorado.edu/>

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