

ADVANTAGES AND DISADVANTAGES OF ARTIFICIAL INTELLIGENCE IN BULGARIAN EDUCATION

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Abstract. Artificial intelligence (AI) is rapidly entering various sectors of the economy, including in the education. AI applications are gradually starting to transform the way we learn and teach, offering both advantages and disadvantages.

The purpose of the publication is to investigate the degree of use of artificial intelligence in Bulgarian educational institutions - schools and universities.

To achieve the goal, the following main tasks are set: to make a literature review of scientific and specialized literature on the specifics of using artificial intelligence in education; to conduct a survey in secondary schools and universities regarding the degree of use of artificial intelligence in Bulgarian education; to bring out advantages and disadvantages of the use of artificial intelligence in education.

Keywords: artificial intelligence; education; Bulgaria; advantages; disadvantages

JEL: I21, J24

1. Introduction

The new world, where artificial intelligence is applied in every industry and aspect of life, is already becoming second nature to us. Strengthen the penetration of all the company's business operations to withstand competitive pressures (Biolcheva & Sterev, 2024).

In the age of artificial intelligence, there is no way that education will not be affected to one degree or another. Whether it's secondary or higher education, artificial intelligence is starting to gradually change the way we learn and teach.

What exactly is artificial intelligence? There are many definitions in the scientific and specialized literature, but in general it can be said that Artificial Intelligence is the ability of a machine to demonstrate abilities inherent in humans - to reason, learn, plan or create (What is artificial intelligence, 2023).

Educational institutions are gradually starting to introduce different, new ways of teaching and the corresponding use of artificial intelligence in the educational process.

The research has highlighted the need and opportunity to find a new way for professional training in higher education, including the integration of educational platforms as part of the so-called hybrid model for transforming teaching practices in the digital era (Torres-Rivera et al., 2021).

The main goal of educational institutions should be how to integrate digital technologies, including AI, into educational processes in such a way as to improve the quality of training and teaching. This is becoming one of the main challenges faced by secondary schools and higher education institutions, which in turn requires the development and improvement of digital knowledge among professors and teachers.

In order to be competitive and cope with the increasingly challenging environment in the future, teachers in higher and secondary schools need to acquire new skills and competencies to maximize the use of information and communication technologies in teaching and learning processes.

Higher education is a process of experience in learning new things. According to the authors, education helps students build their inner growth without age barrier, and they also add that educators should take advantage of this opportunity to integrate computers and other technologies as a learning tool to facilitate the teaching and learning process.

The question often arises, “Is it possible for artificial intelligence to replace the human factor?” This question affects not only education, but all sectors of the economy. In education, it cannot be said that this is possible, but rather, the gaps in teaching and learning are filled with the help of AI. In other words, AI in education should have a complementary, not a primary function, to be used as an additional tool to improve the quality of educational products.

Artificial intelligence will only add value to the quality of learning. There are many arguments for the development of artificial intelligence, which has more and more potential to transform higher education than any other technological advance.

2. Artificial intelligence in education

In the scientific and specialized literature, as a result of conducted studies, several directions and at the same time advantages of the use of artificial intelligence in education have been identified (Torres-Rivera et al., 2021; Brown et al., 2016; Akinwalere & Ivanov, 2022; Ma & Siau, 2018).

– **Individualized/Personalized Learning** – AI provides the opportunity for individualized learning that is difficult to achieve in the traditional classroom. This is done through the provision of various information resources and tasks for pupils and students to perform, tailored to their individual needs and abilities, which increases the effectiveness of training.

– **Access to learning anywhere, anytime** – with the various AI tools/applications, access to learning is ensured for all, overcoming time, geographical and language

barriers. With the help of virtual assistants, online platforms, educational chatbots and virtual classrooms, flexible access to learning resources, answering questions and providing additional materials is provided, facilitating learning for students and students with different schedules and geographical locations. These “virtual assistants” can work 24/7, which increases the accessibility of learning, supporting the learning process outside of the conventional classroom.

– **Automation of administrative tasks** – AI can automate routine tasks such as: grading exam tests and assignments, administering study plans, managing student and student data, properly planning the learning process. This frees up time for teachers, which can be used for personal attention and understanding of learners, faster feedback to students, which cannot be provided by technology in the form of artificial intelligence.

– **Data analysis and trending** – By analyzing large data sets, AI can identify trends and patterns in student performance. This, in turn, allows educators and teachers to anticipate potential problems and take preventive action to improve the learning process.

In the conditions of digital transformation and digitalization, it is necessary to accept the fact that artificial intelligence will increasingly be present in all spheres of education (Markov, 2024). In the education sector, artificial intelligence has already begun to initiate new teaching and learning solutions that are currently being tested and restructured in various directions (Akinwalere & Ivanov, 2022). It can make it more convenient and personalized with the help of its many education applications. So the use of artificial intelligence in education can produce excellent results while dramatically improving traditional methods (Catraio, 2021; How AI in education is revolutionizing the education industry, n.d.).

Although AI provides a number of opportunities, including in education, it also poses a number of problems and difficulties (Torres-Rivera et al., 2021; Brown et al., 2016; Akinwalere & Ivanov, 2022; Ma & Siau, 2018).

– **Lack of personal contact between teachers and pupils/students** – this is one of the main disadvantages of using AI. While AI can provide a variety of learning resources at any time, it cannot replace the human relationships, human element, and emotional support that teachers provide.

– **Dependence on technology** – in the presence of technical malfunctions or a lack of technological resources, it is possible that students and teachers are unprepared for work without technological support. Access to learning materials and resources is also restricted/suspended.

– **Data Security and Ethical Issues** – The use of AI in education raises a number of ethical, security and data privacy issues. The collection and analysis of large amounts of personal data of students requires strict compliance with the legal requirements for the protection of personal information.

– **High investments in time and resources** – the COVID-19 pandemic has undoubtedly accelerated the process of digital transformation in education. However, the integration and use of artificial intelligence in various aspects of the educational process requires significant investment on the part of secondary schools and higher education institutions.

– **Need for training** – in order to effectively use the various applications of AI to improve teaching and learning processes, educators and teachers need to acquire new knowledge and skills in the field of information and communication technologies.

3. Use of artificial intelligence in education in Bulgaria

3.1. Research methodology

In order to analyze the opinion of teachers about the use of artificial intelligence in secondary and higher schools in Bulgaria, a survey of 14 questions was compiled and conducted.

The survey was conducted online and completed anonymously. The survey was conducted between May 20 and July 30, 2024. 135 people responded to it. The number of respondents does not claim to be representative of the sample, but there is an opportunity to outline trends regarding the opinion of teachers about the advantages and disadvantages of using artificial intelligence in education.

The questions in the survey are closed, which makes it easier for respondents to complete it. Some of them use a five-point Likert scale, which allows respondents to express how much they agree or disagree with a given statement. Specifically, the survey used questions about the frequency of use of artificial intelligence, its effectiveness in improving the learning process and improving student achievement. To the questions about advantages and disadvantages of AI, respondents have the option to indicate more than one answer. Multiple-choice questions give respondents the freedom to express their opinions in more detail without feeling constrained by pre-set choices.

3.2. Results

The first 4 questions aim to establish the gender, age, position in the educational institution and duration of work in an educational environment of the respondents.

The percentages of responses to the survey questions are presented as figures below.

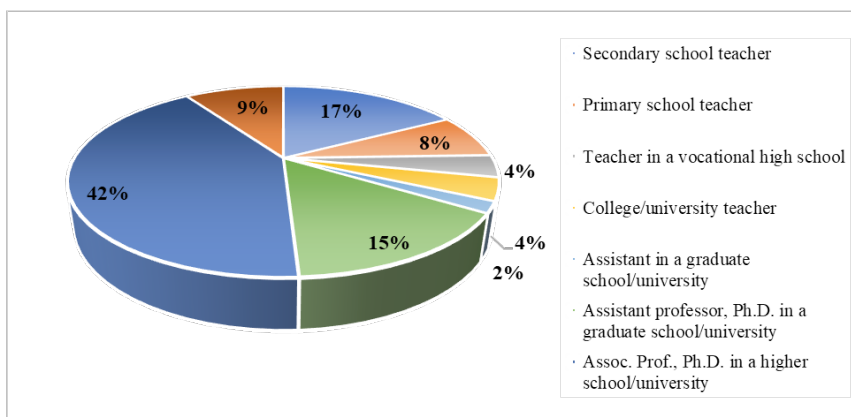


Figure 1. Answer the question „What position do you hold in the education system?“

The largest percentage of respondents to the survey are associate professor doctors in higher education institutions/universities, followed by teachers in secondary schools (Fig. 1).

The age profile of the respondents is – the largest percentage of respondents are between the ages of 36 and 50 (49%), followed by those aged 51 and over (42%).

Gender distribution of the respondents is the slight predominance of the female gender (55%).

The relationship in percentages of the respondents and their work experience in education is shown in fig. 2. The largest percentage is those who work in an educational institution for more than 6 years. This can also be matched with their age.

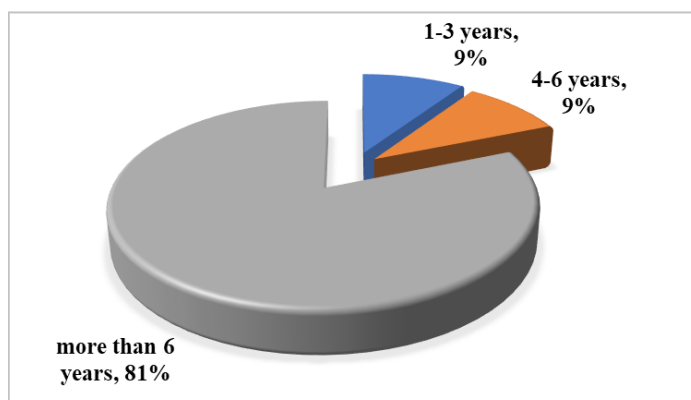


Figure 2. Answer the question „How many years have you been teaching?“

Figure 3 gives an answer to the question of how often the respondent uses artificial intelligence in his work. An interesting fact is that the largest percentage answered never, which can lead us to the conclusion that they either do not know exactly what artificial intelligence is and what applications it has, or the use of artificial intelligence by educators is still not really advocated in their work.

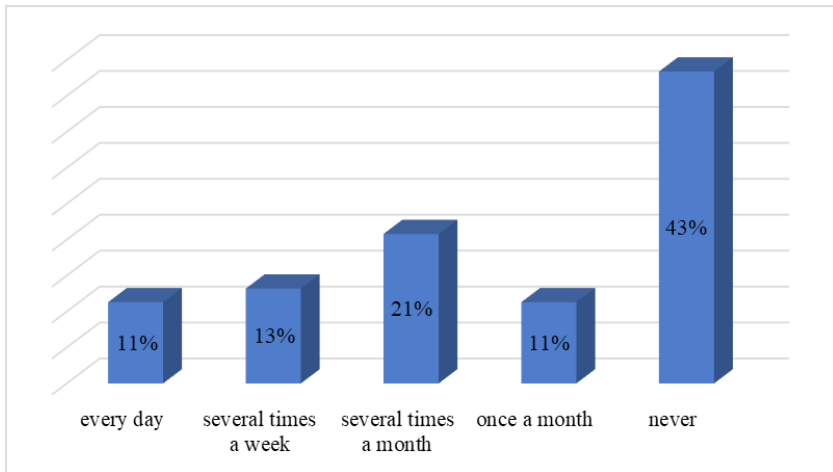


Figure 3. Answer the question „How often do you use AI in your work/learning?“

Although most respondents answered that they do not use artificial intelligence, when asked what applications of AI they know and/or use in education, the largest percentage answered that these are applications for creating learning content/ educational resources and only 2% have replied that they do not use it (Fig. 4).



Figure 4. Answer the question „What applications of AI in education do you know and/or use?“

Figure 5 answers the question, how does the teacher evaluate the effectiveness of AI in improving the learning process? The largest percentage answered that they could not judge, followed by those who considered it effective.

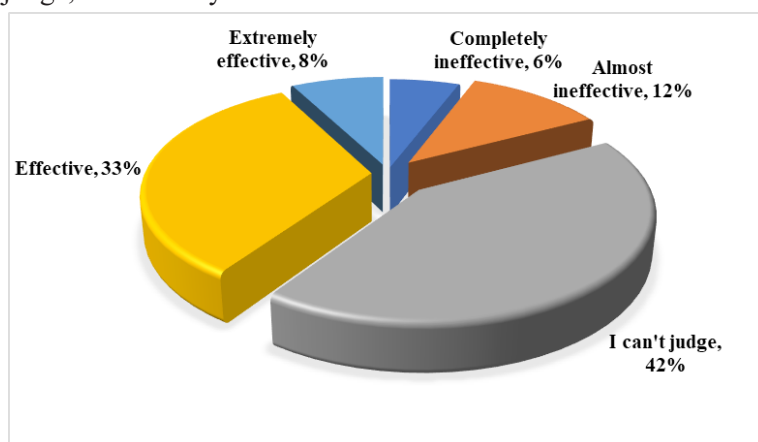


Figure 5. Answer the question „How do you rate the effectiveness of AI in improving the learning process?“

When asked if they thought AI could replace traditional teaching methods, most respondents said they couldn't tell (Fig. 6).

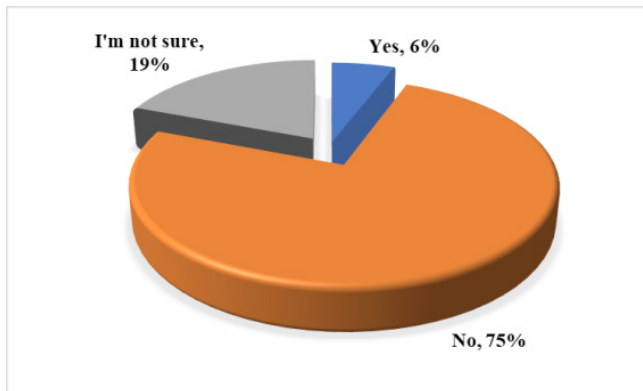


Figure 6. Answer the question „Do you think AI can replace traditional teaching methods?“

In terms of the main benefits of AI in education, most respondents cited improving access to educational resources, followed by data analysis and trending, and overcoming space and time constraints and language barriers (Fig. 7).

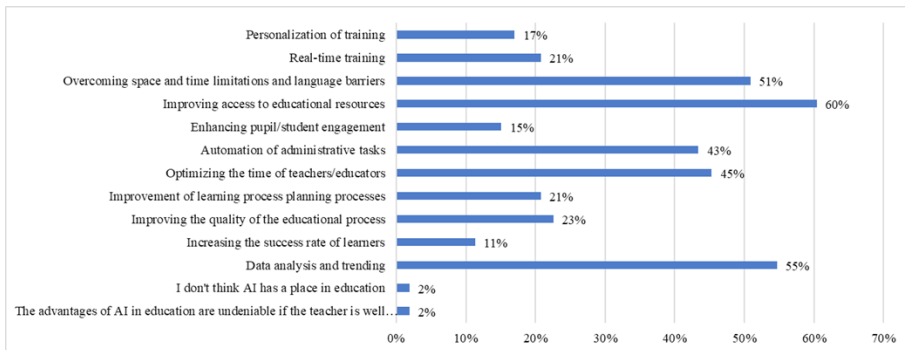


Figure 7. Answer the question „What do you think are the main advantages of using AI in education?“

And when asked about the disadvantages of AI in education, the largest number of respondents believe that these are loss of personal contact/lack of emotional support from teachers/tutors to learners, dependence on technology and insufficient development of social skills (Fig. 8).

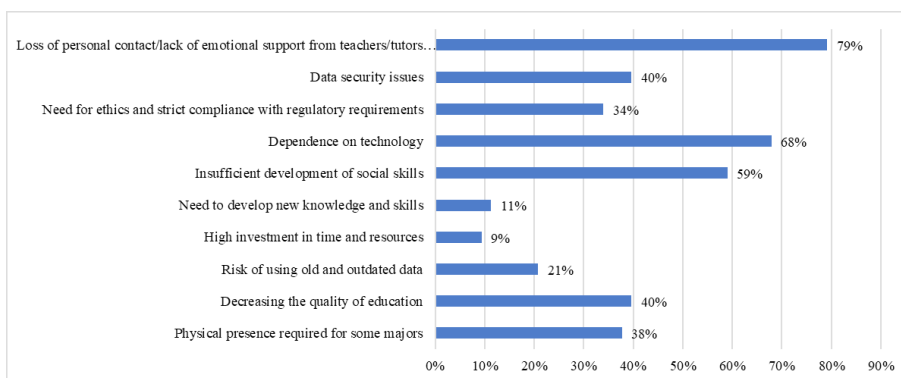


Figure 8. Answer the question „What do you think are the main disadvantages of using AI in education?“

When asked to what extent do you think AI can improve student learning/achievement, the largest percentage answered somewhat, followed by those who were not sure (Fig. 9).

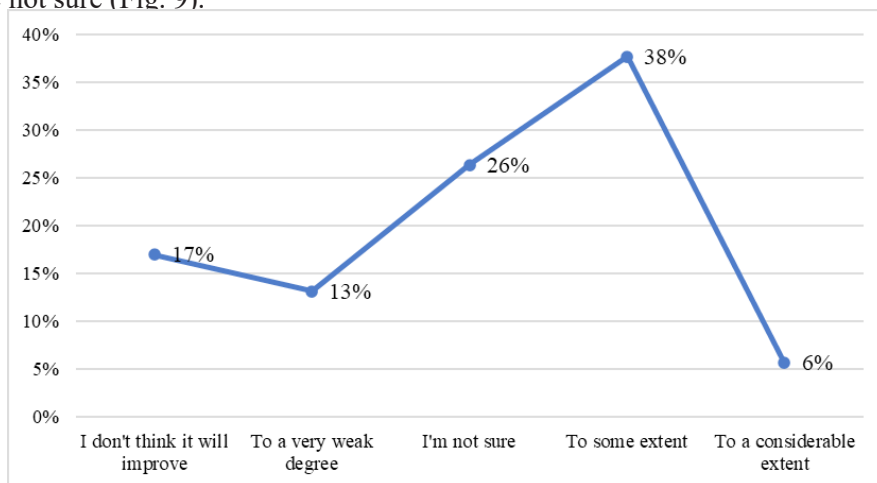


Figure 9. Answer the question „To what extent do you think AI can improve student learning/achievement?“

Figure 10 provides an answer to the question of what educators' expectations are for the future of AI in education. Almost equally, the responses were mostly moderate influence in some areas and significant influence in all aspects of education.

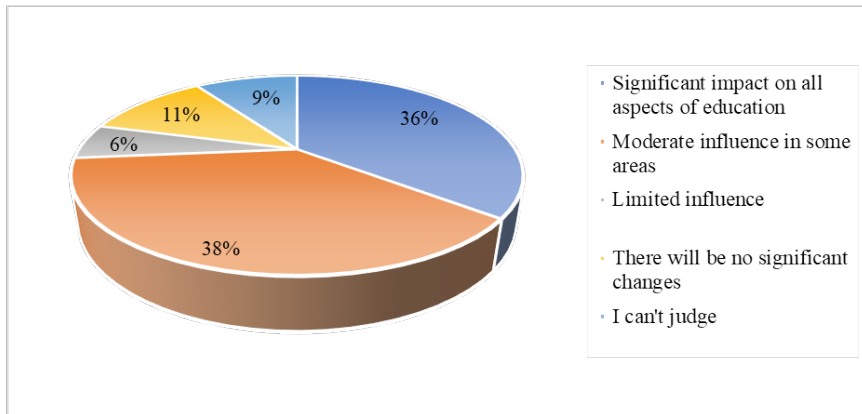


Figure 10. Answer the question „What are you expectation for the future of AI in education?“

The last two questions to teachers asked whether they could recognize if their students were using ChatGPT-type applications to write their assignment and how often they thought this was happening.

74% think they can guess that their students have used a similar application to solve their assignment. And 59% believe that students often resort to this type of application when assigned work.

4. Conclusion

Artificial intelligence is still a relatively new concept in Bulgaria. However, quite a large number of solvent people in our country have started to buy machines with artificial intelligence, mostly to override them in their daily household work. A person rarely thinks about the advantages and disadvantages of artificial intelligence unless it directly affects them. A person's biggest fear is not being replaced by an artificial intelligence machine in their job. The teaching profession is mostly about communication between two or more people on a given topic. The research carried out showed that in Bulgaria, teachers in schools and universities at this stage do not think that they will be replaced by artificial intelligence and will lose their jobs. They do not see particular advantages of AI, but rather consider its disadvantages such as loss of personal contact and dependence on technology. It is the opinion of

the authors that this is an issue that will be subject to increasingly extensive research in the future.

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