Borisov, B., & Stoyanova, T. (2024). Artificial intelligence in higher education: pros and cons, *SCIENCE International journal, 3*(2), 01-07.
doi: 10.35120/sciencej0302001b UDK: 004.81:159.953.5]:378(497.2)

ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION: PROS AND CONS

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Abstract: The educational system, unlike other social systems, is distinguished at the same time by conservatism, necessary to protect itself from frequent and thoughtless changes as a result of temporary conjunctural moods, and modernism, expressed in the desire to prepare learners for the current needs of society. This duality also gives rise to many arguments for and against the introduction of artificial intelligence (AI) in education - if it does not, the education system will fall behind the realities, if it does, it may compromise its main purpose - to provide validated and verified knowledge to students and the students.

The purpose of this article is to examine the possibilities of using AI in universities and to reveal the limitations that hinder it. In this sense, the object of the study is artificial intelligence, and the subject - its application in the higher education system. The purpose of the study is to examine, through a SWOT analysis, the opportunities and threats in the use of AI applications in universities, as well as their strengths and weaknesses, determining their readiness for it. A study has been conducted that shows that the opportunities for using artificial intelligence in education slightly outweigh the threats, and the strengths of universities as a terrain for implementing AI. The analysis also highlights what are the main levers for the development of AI in universities, what are the limitations to it, what are the risks that may occur in the future and what are the problems that can be expected if threats are not overcome and weaknesses are minimized.

It is concluded that AI applications can be very useful in the work of teachers, and students want them, but this should be done carefully, respecting certain principles of equality, credibility, ethics and guaranteeing human rights.

Keywords: artificial intelligence, higher education, SWOT analysis
Field: Social Sciences

1. INTRODUCTION

Artificial Intelligence (AI) is one of the fastest growing technologies in the world. It has the potential to change our entire lives – from the way we work to the way we rest, learn and take care of our health. There are a number of publications and discussions about the possibilities of AI in different areas of public life. Specifically for the field of education, it is believed that AI can be used for writing letters, for rapid language translations, for generating ideas and preparing for assignments and tests, for analyzing and summarizing texts, for checking written works and giving of personal guidance to the trainees (Classroomtech, 2024).

The Report on Artificial Intelligence in Education, Culture and the Audio-Visual Sector published by the European Parliament's Committee on Culture and Education emphasizes that AI and related technologies are of strategic importance for the Union, emphasizes that the approach to AI and related technology must be human-centered and based on human rights and ethics so that it truly becomes a tool that serves people, the common good, and the common interest of citizens. It states that the development, implementation and use of AI in education, culture and the audiovisual sector must fully respect fundamental rights, freedoms and values, including human dignity, privacy, protection of personal data, non-discrimination and freedom of expression and information, as well as cultural diversity and intellectual property rights, as provided for in the Treaties of the Union and the Charter of Fundamental Rights. Attention is drawn to the fact that education, culture and the audiovisual sector are sensitive areas when it comes to the use of AI and related technologies, as they have the potential to affect the cornerstones of fundamental rights and values of our society (Европейски парламент. Комисия по култура и образование, 2021).

In Bulgaria, AI is also developing at a fast pace. In 2022, the State Concept for the Development of Artificial Intelligence in Bulgaria was adopted, which envisages the creation of a national network of centers for artificial intelligence, as well as the funding of research and development in this area, and the Ministry of Education and Science published a draft of document called "Artificial Intelligence in Education and Science. Ideas for the development and use of AI in education and science in the

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Republic of Bulgaria", which examines the main aspects of the use of AI applications in the educational process. All this provoked our interest in conducting an empirical study among teachers, students and doctoral students from the University of National and World Economy, Sofia (UNSS), the object of which is artificial intelligence, and the subject - its use in the higher education system. The purpose of the study is to examine, through a SWOT analysis, the opportunities and threats in the use of AI applications in universities, as well as their strengths and weaknesses, determining their readiness for it.

2. MATERIALS AND METHODS

To survey the views of faculty and students on their views on the opportunities and threats of using AI, as well as on the strengths and weaknesses of universities in this area, a questionnaire was generated with a list of ten external opportunities and threats, as well as ten potential strengths and weaknesses, among which the survey respondents had to select and rate the five most important of them. The questionnaire was completed by 255 respondents, among them 175 students and doctoral students and 80 teachers. They were asked to rate on a scale of 1 (lowest importance) to 10 (highest importance) the opportunities, threats, strengths and weaknesses listed in the questionnaire. The answers made it possible to carry out a SWOT analysis to reveal which are the most significant external and internal factors for the use of AI in universities and, on this basis, to outline the main directions for development, the limitations that will be experienced in this area, potential risks and future problems.

The list of external factors that the respondents had to rate depending on their importance is presented in Table 1, and the list of internal strengths and weaknesses is presented in Table 2.

3. RESULTS

According to the educators surveyed, the main **opportunities** for applying AI in higher education are that AI systems can be used to analyze learning data to identify areas where teaching and learning can be improved, that they can generate different research assignments for students based on what they have learned so far, improve communication between faculty and students through automatic reminders, progress updates and personalized advice , be used to create virtual assistants that can provide students with assistance and support, as well as being able to quickly and accurately grade assignments and tests, providing immediate feedback to learners.

Undergraduates and PhD students are excited that AI can create engaging, interactive learning experiences through the use of technologies such as virtual reality (VR), augmented reality (AR) and learning games. AI can analyze individual student strengths and weaknesses, learning styles and rates of progress. This enables the creation of personalized study plans that address the unique needs of each student, ensuring that they learn at their own pace and in their own style, improve communication between teachers and students through automatic reminders, progress updates and personalized advice. to make education more accessible to students with disabilities by offering features such as text-to-speech, speech recognition and real-time subtitling, and to be used to create virtual assistants that can provide students with help and support. The total score of the five most important capabilities is 70.

Table 1. Opportunities and threats to the use of artificial intelligence in universities.

OPPORTUNITIES	THREATS
a) AI can analyze individual student strengths and weaknesses, learning styles and rates of progress. This enables the creation of personalized study plans that address the unique needs of each student, ensuring that they learn at their own pace and in their own style;	a) AI systems are trained on large data sets, and if that data contains biases, the AI system can also become biased. This can lead to inequitable outcomes, such as misclassifying students from minority or marginalized groups as less able;
b) AI can create engaging, interactive learning experiences by using technologies such as virtual reality (VR), augmented reality (AR) and learning games. These environments can help improve understanding and retention of information, making learning more enjoyable and effective;	b) There is a risk that educators and students will become overly dependent on AI, leading to a decline in critical thinking, problem-solving skills, and other basic cognitive skills. This can negatively impact the overall educational environment and student outcomes;
c) AI can quickly and accurately grade assignments and tests, providing immediate feedback to learners. It also frees faculty from administrative burdens, allowing them to focus on more strategic aspects of teaching;	c) AI systems cannot completely replace human contact and interaction. An over-reliance on AI can lead to a reduction in opportunities for face-to-face communication, collaboration and relationship building, which are important aspects of the educational process;
d) AI can make education more accessible to students with disabilities by offering features such as text-to-speech, speech recognition and real-time subtitling;	d) Users of AI systems, such as teachers and students, may not understand how these systems work or how decisions are made. This may lead to a lack of trust in the system and reluctance to use its products or services;
e) AIs enable students to develop skills such as creativity, critical thinking and problem solving;	e) AI systems may be vulnerable to cyber threats such as hacking, phishing attacks and malware. These threats can compromise data security, disrupt system performance, and even cause physical harm if they target connected devices;
f) AI can improve communication between faculty and students through automatic reminders, progress updates and personalized advice;	f) The use of AI in education raises a number of ethical issues, such as who controls and has access to student data, how that data is used and what rights students have in relation to their data;
g) AI systems can be used to create virtual assistants that can provide students with help and support. These assistants can answer questions, offer resources, and even provide emotional support;	g) AI systems do not directly inform how they make decisions and generate content. This can lead to a lack of trust in AI systems and compromise human decision-making responsibility;
h) AI can generate different research tasks for students based on what they have learned so far;	h) Some people fear that AI systems could eventually automate many of the tasks currently performed by lecturers, which could lead to job losses in universities;
i) AI systems can be used to analyze learning data to identify areas where teaching and learning can be improved. This information can be used to develop more effective curricula and resources;	i) AI systems can be used to manipulate students, for example by targeting them with personalized advertising or propaganda;
j) AI systems can more easily detect attempts at plagiarism, borrowing texts and ideas from foreign authors.	j) There is a fear that excessive use of AI in education may lead to its dehumanization. AI should complement, not replace, human interaction.

Source: the authors.

Educators believe that the biggest **threats** to the implementation of AI in higher education are related to the fact that the systems are trained on large data sets and may contain biases, which can lead to unfair results, such as misclassifying students from minorities or marginalized groups as less capable. It is considered that they do not give direct information about how they make decisions and how they generate content, which can lead to a lack of trust in AI systems and compromise the responsibility of people in decision-making, that they cannot fully replace human contact and interaction . and an over-reliance on AI can lead to a reduction in opportunities for face-to-face communication, collaboration and relationship building, which are important aspects of the educational process. AI systems may be vulnerable to cyber threats, such as hacking , phishing attacks and malware. These threats can compromise data security, disrupt system performance, and even cause physical harm if they target connected devices. Educators may become overly dependent on AI, leading to a decline in critical thinking, problem-solving skills, and other basic cognitive skills.

Students also believe that they can become overly dependent on AI, leading to a decline in critical thinking and problem-solving skills, and that AI systems can be used to manipulate students, for example by targeting personalized advertising or propaganda to them, that their use in the educational process can lead to a lack of trust in AI systems and compromise the responsibility of people in decision-making, that the use of AI in education raises a number of ethical questions, such as who controls and has access to student data, how that data is used and what rights students have in relation to their data. The external threat score is 67.

Table 2. Strengths and weaknesses of universities regarding the use of artificial intelligence-

STRENGTHS	WEAKNESSES
a)Universities have vast amounts of data, including research publications, dissertations, student records and feedback. This data can be used to train AI systems for various tasks, such as personalizing learning, improving the efficiency of administrative tasks, and discovering new patterns in research;	a)Developing and deploying AI systems can be expensive, which may limit access to them for some universities;
b)Universities are a place where many researchers work in different fields of science. They could more easily find the useful application of AI systems in their work than other people, because creativity and innovation are inherent in them;	b)Teachers prefer to impart knowledge to students rather than teach them to interpret knowledge acquired from different sources and this puts them in an uncomfortable situation;
c)Universities periodically update their curricula, preparing students for the jobs of the future. They can offer both undergraduate and graduate programs in AI, as well as continuing education courses for working professionals;	c)Many educators and administrators are unfamiliar with AI and how it can be used in education. This can lead to reluctance to adopt AI technologies;
d)Universities have a strong tradition of ethics and social responsibility. This framework can help them ensure that AI is used in a way that benefits society and does not harm individuals;	d)Some universities may not have the necessary infrastructure, such as computer equipment and Internet connectivity, to support AI systems;
e)Universities participate in broad networks of peer universities as well as other organizations that can be used to share AI-related knowledge and resources;	e)Some faculty and/or students may resist the use of AI because they lack the necessary computer skills or language skills to use it effectively;
f)Universities offer an ideal environment for research and experimentation with AI in education. Students can serve as a valuable source of feedback and can participate in the process of developing and testing AI systems;	f)Some educators and/or students believe that an over-reliance on AI may lead to a decline in learners' critical thinking, creativity and emotional intelligence;
d)Universities encourage multidisciplinary collaborations that can benefit the development of AI systems in education. By bringing together experts from different fields, universities can create holistic solutions that address multiple aspects of the educational process;	g)Many universities rely on external providers for AI technology and services. While this can save time and resources, it can also lead to dependence on these suppliers and potential problems if the relationship deteriorates or the supplier goes out of business;
h)Universities have traditionally been at the forefront of educational innovation. They are well positioned to embrace new technologies like AI and incorporate them into their curricula and operations;	h)Some teachers and/or students mistrust AI systems, due to uncertainty about how they generate content and depersonalization of decisions;
i)Many universities have strong ties to the tech industry, which can provide access to the latest AI technologies and expertise. These partnerships can help universities implement AI more effectively and provide students with hands-on experience in the field;	i)There are teachers who tend to borrow texts from foreign authors and would resist the implementation of AI systems because they would recognize attempts at plagiarism;
j) As institutions dedicated to preparing students for the future labor market, universities are naturally inclined to explore and adopt new technologies such as AI. This can give them a competitive edge in the educational field.	j)Universities have a conservative decision-making process due to bureaucracy and the need to obtain approval from various levels of management. This can slow the adoption and implementation of new technologies such as AI.

Source: the authors.

The top five most significant **strengths** of universities in applying AI according to faculty are that they regularly update their curricula, preparing students for the jobs of the future, and can offer both bachelor's and master's programs in AI, as well and continuing education courses for working professionals. They have vast amounts of data, including research publications, dissertations, student records, and feedback, which data can be used to train AI systems for various tasks, such as personalizing learning, improving the efficiency of administrative tasks, and detecting new models in research. Universities participate in broad networks of similar universities as well as other organizations that can be used to share AI-related knowledge and resources. They employ many researchers working in various fields of science who could more easily find the useful application of AI systems because of their inherent creativity and innovation. Universities offer an ideal environment for research and experimentation with AI in education. Students can serve as a valuable source of feedback and can participate in the process of developing and testing AI systems.

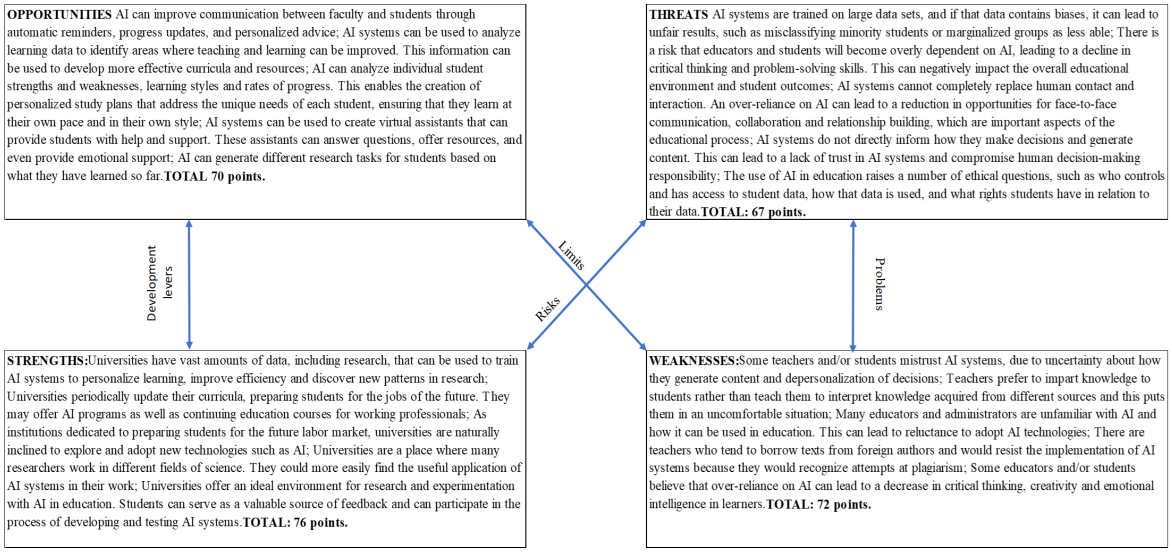
According to the students and PhD students surveyed, universities are naturally inclined to explore and adopt new technologies such as AI. This can give them a competitive edge in the educational field. Another of their strengths is that research papers, research publications, dissertations and other scientific works generated in universities can be used to bring the learning content closer to the problems of practice. Universities encourage multidisciplinary collaborations that can benefit the development of AI systems in education. By bringing together experts from different fields, universities can create holistic solutions that address multiple aspects of the educational process. The overall score for universities' AI application strengths is 76.

In terms of **weaknesses** , educators and students agree that an over-reliance on AI can lead to a decline in learners' critical thinking, creativity and emotional intelligence. Both groups distrust AI systems due to uncertainty about how they generate content and depersonalization of decisions. They believe that there are teachers who tend to borrow texts from foreign authors and would resist the implementation of AI systems because they would recognize attempts at plagiarism. However, the students also claim that many educators and administrators are unfamiliar with AI and how it can be used in education. This

can lead to reluctance to adopt AI technologies. They believe that teachers prefer to impart knowledge to students rather than teach them to interpret knowledge acquired from different sources and this puts them in an uncomfortable situation. The total score of the five most important weaknesses is 72.

The SWOT analysis shows that the opportunities for using AI in universities slightly outweigh the threats, and the strengths outweigh the weaknesses. Their combination, as indicated in Figure 1, makes it possible to highlight what will be the main levers for the development of artificial intelligence in universities, what will be the limitations in this regard, what risks can be expected and what problems will be experienced in the future. For example, the combination of external opportunities with the strengths of universities outlines as their **strategic tasks** the development of new curricula and resources based on the large amount of data at their disposal that can be more easily used with the help of AI , to direct their scientific research in the field of application of AI in various spheres of public life and its future development, to make the learning process more attractive and more effective, as well as to reach a larger number of learners.

Figure 1. SWOT matrix of opportunities, threats, strengths and weaknesses regarding the implementation of artificial intelligence in universities.



Source: the authors.

The limitations they will experience in the future may stem from the fact that some educators distrust AI , that many of them prefer to impart knowledge instead of having students find it themselves and teach them how to interpret it, that are afraid that the use of AI will not reveal the borrowing of texts from foreign authors in their works, and that an over-reliance on AI may lead to a decrease in the critical thinking, creativity and emotional intelligence of the learners and thus render useless the use of the rich arsenal of research and databases available to universities.

The combination of strengths with external threats suggests certain **risks** that universities must guard against in the future. There is a risk that teachers and students will become too dependent on AI, relying on it to replace human contact and interaction in the learning process, which renders meaningless the idea of increasing the pedagogical skills of teachers who may become technicians handling various software products and online platforms, there is also a risk of violating the ethical principles related to the rights of learners.

The main **problems** facing the use of AI in universities are related to the fact that they will not be able to cope with external challenges if they do not overcome their weaknesses, such as ignorance of AI applications, lack of computer skills and lack of appropriate digital infrastructure, practicing of old forms of education, which rely on the transmission of a lot of knowledge without forming in students the skills to handle it.

4. DISCUSSION

The use of AI in education systems brings a wide range of opportunities and tools to achieve more innovative, inclusive, efficient and increasingly effective education by introducing new high-quality learning methods that are fast, personalized and learner-centered; stresses, however, that given its impact

on education and social inclusion, the availability of such tools must be guaranteed for all social groups, ensuring equal access to education and training, leaving no one behind, in particular people with disabilities. The real goal of AI in European education systems should be to achieve the most individualized learning possible, offering learners personalized academic paths according to their strengths and weaknesses and didactic materials tailored to their characteristics, while maintaining educational quality and integrating principle of our education systems. At the same time, the paper expresses concern about the lack of specific higher education programs dedicated to AI and the lack of public funding for AI among member states, and also that few AI researchers pursue academic careers as tech companies can offer better pay and less research red tape. This forces more public funding into AI research at universities (Европейски парламент. Комисия по култура и образование, 2021).

In the aforementioned document of the Ministry of Education and Science of Bulgaria "Artificial Intelligence in Education and Science. Ideas for the development and use of AI in education and science in the Republic of Bulgaria", it is stated that "Bulgarian higher education institutions should make efforts to adapt to the new opportunities and challenges based on the development of digital technologies." In the higher education system it is recommended to introduce and control the effect of the use of artificial intelligence in general and specialized disciplines. General should include mathematical knowledge and skills, logical and algorithmic knowledge and skills, knowledge of the history of AI, knowledge of ethical and social issues in the context of AI as well as the fields of AI applications. Specializations should include knowledge and skills in the basic tools for creating and modifying AI, as well as AI architectures and the various functionalities of narrow AI.

Among the main tools that should be introduced in AI education are as follows:

1. Electronic platforms with educational resources in the field of AI;
2. Creation of open data repositories that can be used in training artificial intelligence models;
3. Integration of analytical modules based on artificial intelligence in e-learning platforms in higher education institutions and public scientific organizations;
4. Creation of a unified national educational platform that integrates the internal systems of universities and research institutes, that allows the transfer of courses and credits in the field of artificial intelligence and related disciplines between different institutions;
5. Creating educational ecosystems in higher education institutions for lifelong learning using and for AI (Министерство на образованието и науката., 2020).

Along with the obvious recommendations for using AI applications in education, there are also many opinions about taking a more cautious approach, since AI is developing at a very fast pace and the possible negative consequences of this are unexplored or unpredictable at this time. stage. One of the main questions is how to ensure that AI systems are transparent and accountable for the results of their action, which is related to the distribution of responsibilities between man and machine. How will the right to privacy, requiring informed consent, be protected when using AI in traditionally protected and private spheres, and can an algorithm be sued for abuse? Abuse of AI can threaten not only digital security, but also physical and public safety, through hacking attacks on public sites, voter misinformation and even election manipulation. In healthcare, there are strong ethical, psychological and legal concerns about breaching the confidentiality of information shared between doctors and patients. But perhaps the biggest impacts of AI are expected precisely in the field of education, since everything starts from education, there not only knowledge is acquired, but the overall worldview of learners is formed, their attitude to social processes, work skills are formed and behavioral attitudes. Therefore, before proceeding with the use of AI applications in the educational process, the benefits and risks should be carefully considered (European Parliament, 2019).

5. CONCLUSION

In conclusion, it can be said that the title of this article is a bit provocative, because the argument for and against artificial intelligence is unnecessary, what is more important is to talk about where and how it can be used and how to protect ourselves from the risks that may arise from this. Instead of over-excited enthusiasm, we should have reasonable confidence that when using AI in our daily lives, we will not allow the basic principles of equality, credibility, ethics and guaranteeing human rights to be violated . Therefore VI . Levchev warns: "Democracy is free conversation and debate between different people with different ideas." But we cannot have such a free conversation with a machine. We can't convince the machine that we're right about anything, but it can convince us. Because it can affect our reason, our conscience and our emotions. Thus, artificial intelligence can destroy from within this free conversation that is democracy, even without ideologically opposing democracy (Левчев, Януари 2024).

One of the biggest cyber threat concerns is that of deepfakes - completely fabricated images or videos of people that can misrepresent, implicate or harass them. Deepfake AI technology isn't yet good enough to be a significant threat, but that could change, Keumars Afifi-Sabet says. Rumors have surfaced of advanced technology that could threaten the future of humanity. This OpenAI system , called Q* (Q-star), may embody the potentially innovative implementation of General Artificial Intelligence (AGI - Artificial General Intelligence), reports Reuters . Little is known about this mysterious system, but if reports are true, it could take AI capabilities up a few notches. AGI is a hypothetical tipping point called the "singularity" where AI becomes smarter than humans (Afifi-Sabet, 2023).

We can't say whether it will happen sooner or later, but it certainly will. That is why the great science fiction writer Azak Asimov started speaking more than 70 years ago . Because AI is no longer " ante portas ", it is already " in domo " .

ACKNOWLEDGMENTS

This publication was made in connection with the realization of Project No. KP-06-H 45/7 entitled "DIGITALISATION OF THE LEARNING PROCESS IN HIGHER EDUCATION - IDENTIFICATION AND MANAGEMENT MODEL"

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