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AI-BASED TOOLS' IMPACT ON UNIVERSITY EDUCATION

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Purpose: The main reason for writing the paper was to present the latest research studies on using AI in education and present the survey studies on students' opinions according to AI-based tools in learning process.
Design/methodology/approach: The theoretical part of the article presents research from the last 5 years on AI in education and higher education. The empirical part presents the results of surveys conducted among students of the University of Economics in Krakow on their opinions on the impact of AI-based tools on their learning process.
Findings: The research show that the vast majority (95.1%) of respondents see that tools based on AI facilitate the learning process and provide valuable didactic support. Despite positive assessments, respondents express concerns about credibility, privacy and potential addiction to technology.
Research limitations/implications: The results suggest the need for appropriate regulation and education regarding the use of AI-based tools. The study is limited by the too rapid development of AI in recent times and the ever-increasing number of new tools used in the student learning process.
Practical implications: The study revealed that 95.1% of students find AI tools like ChatGPT, Canva, and Quizlet beneficial for learning, although concerns about credibility, privacy, and dependency remain. It suggests universities should implement AI tools and train staff in their use while addressing risks and ensuring equal access for all students.
Social implications: By highlighting the benefits of AI in education, the study may foster more positive public attitudes towards technological integration in learning environments. With AI tools enhancing the learning experience and potentially improving educational outcomes, students may enjoy improved academic success and career prospects, ultimately contributing to a higher quality of life.
Originality/value: The study is notable for its focus on students and their subjective assessments of the opportunities and concerns related to the use of AI, especially in the context of tools such as ChatGPT, Canva, and Quizlet, which sheds light on their growing importance and challenges in higher education.
Keywords: artificial intelligence, AI, AI-based tools, university education.
Category of the paper: research paper.

1. Introduction

The concept of Artificial Intelligence (AI) was born in the 1950s. The original goal of AI research was to create a human-like robot capable of thinking analogous to human thinking. It is important to note that the goal was not a typical computer program. A computer is not capable of thinking, drawing conclusions, learning, or creating new ideas, operating only from a strict set of instructions programmed in languages such as C++, Java or Ruby. The foundation of AI, on the other hand, is the automation of thought processes that humans normally perform. AI, understood in this way, encompasses a broad field that includes machine learning and deep learning (Chollet, 2018).

At the beginning of its development, AI focused on solving tasks that were intellectually challenging for humans but relatively simple for computers, such as games that require formal description, such as chess. Today, the main challenge for AI has become tasks that humans perform intuitively and that are difficult to formalize, such as speech recognition or identifying faces in photos (Goodfellow et al., 2016).

Education is one field that is experiencing significant tensions due to increasing computerization and changes in the labor market. The 21st century brings challenges, such as ensuring equal access to modern technology for a wide range of students. In this context, AI is emerging as an opportunity to address educational barriers and accelerate learning processes. Despite positive expectations, there are concerns about the impact of technology on education, which highlight the difficulties of adapting to rapid technological change (Witek-Crabb, 2012).

The aim of the article is to present the latest research on the use of AI in education and to present surveys on students' opinions on AI-based tools in the learning process. The first part of the article presents an overview of the latest research on AI in education and higher education, as well as the characteristics of selected AI-based tools used for learning by students. Next, a description of the research method and the results of surveys conducted among students of the University of Economics in Krakow on their opinions on the impact of AI-based tools on their learning process are presented. The aim of the study was to explore students' opinions on the use of AI-based tools during learning and classes, as well as the opportunities and threats associated with their use.

The originality of the presented article consists in its focus on students' subjective assessments of the opportunities and challenges associated with the use of AI-based tools in higher education, such as ChatGPT, Canva, and Quizlet. The study highlights the growing importance of these tools and reveals both their positive impact on the learning process and concerns about credibility, privacy, and potential dependency on technology. The findings, emphasizing the need for regulation and education regarding the use of AI in education, contribute significantly to the evolving field of research on technology integration in academic environments.

2. Literature review

With the ever-increasing popularity of AI-based tools, a great deal of scientific research is being undertaken on this issue, both in Poland and abroad. Research indicates that AI is becoming more prevalent in education, offering numerous benefits, but also posing risks and challenges that must be consciously addressed. The researchers point to the need to adapt the curriculum for generative AI and raise the issue of combining deep learning with symbolic AI (Bajak, Spendel, 2024).

Furthermore, an extensive literature review was conducted on the impact of AI on education in 2020. The aim of the research was to assess how AI affects administrative management, teaching and learning processes in educational institutions. The authors focused on various forms of AI application, from initial implementations in computers to advanced web-based and intelligent educational systems. The results indicated that AI has significantly improved administrative efficiency, enhancing the quality of teaching by personalizing learning materials and improving the learning process by tailoring content to individual students' needs. The study also highlighted the need for further research into the use of AI in education to maximize its potential while minimizing privacy and ethical risks (Chen et al., 2020).

The AI research also addressed the issue on characterizing students' attitudes toward the use of ChatGPT in education. A diagnostic survey method was used for the study, and an online questionnaire was completed by 189 students between the ages of 17 and 52. The results of the survey showed varying attitudes toward ChatGPT among students, with science students showing more positive attitudes compared to social sciences and humanities students. The study also found that these differences manifested themselves in both beliefs about the tool's usefulness and emotional responses to it. The article's authors recommend that educators prepare for student use of ChatGPT and develop guidelines for its use in educational contexts (Franczyk, Rajchel, 2024).

Studies on how students use AI have found, among other things, that: Students most often use it several times a week; ChatGPT is the most popular AI tool among students; Teachers mostly do not encourage students to use AI tools in the learning process; The main purpose of using AI in education is to facilitate access to educational resources (Raszyd et al., 2024).

The results of a survey conducted among students at the University of Economics in Krakow were also published. The purpose of the research was to identify students' opinions on the possibility of using ChatGPT in solving specific decision-making problems. The surveys were conducted during classes in the summer semester of the 2022/23 academic year. The results of the survey indicate positive impressions of most students towards the use of ChatGPT in classes, although there were also concerns about laziness, plagiarism and loss of information-seeking skills (Cabała et al., 2023).

The challenges facing modern universities in the context of the development of AI were also analyzed. The author used a literature analysis method to identify key challenges and risks associated with the integration of AI into educational processes. The analysis showed that despite significant financial resources and research freedom, universities are still too slow to respond to dynamic changes in technology. Charchuła stressed that full adaptation of educational systems to the rapidly changing artificial intelligence environment is impossible due to the difficulty of predicting its development. Nevertheless, a partial lack of adaptation can be beneficial, as it allows for caution and avoids the potential negative effects of adopting new technologies too quickly. The article suggests that universities should seek a balance between adaptation and caution to maximize the potential of AI while minimizing risks (Charchuła, 2024).

In addition, the literature discusses the opportunities and risks of AI in education. The author emphasizes that AI is a technological revolution with potential in education and there is no uniform definition of it. According to her, AI offers individualization of the educational process, personalization of materials, support for students with special needs; supports students with disabilities, such as by translating speech into subtitles, and helps teachers with administrative tasks and assessment. On the other hand, the author points out, there are concerns about the security of student data and the biases of algorithms; It is necessary to maintain ethics, security and privacy when using AI, and AI affects social interactions and relationships between teachers and students (Więckiewicz-Modrzewska, 2024).

3. Selected AI-based tools

In recent years, (AI)-based tools have revolutionized various aspects of life, including education. Teachers and students are increasingly using these innovations to facilitate the teaching and learning process. This chapter will present a selection of AI-based tools that can be used in the educational process (Hadacs, Schulcz, 2021).

ChatGPT (https://chatgpt.com/) is an advanced natural language model developed by OpenAI that can generate texts, answer questions, and assist learning through dialogue. Teachers can use ChatGPT to design teaching materials, create exam questions, or even as an assistant to communicate with students. Students, on the other hand, can use ChatGPT as a resource for helping with homework, getting clarification on difficult questions, or learning through interaction.

Grammarly (https://www.grammarly.com/) is a grammar and writing style improvement tool that uses AI to analyze text and suggest revisions. It is an invaluable resource for students working on essays and for teachers preparing teaching materials. Grammarly helps identify

grammatical and stylistic errors and ensure text consistency, which is crucial in the academic world.

Canva (https://www.canva.com/pl_pl/) uses AI to simplify the graphic design process. Teachers can use the tool to create visually appealing presentations, posters or educational materials. Students will find Canva an easy way to prepare designs and presentations that are aesthetically pleasing and easy to read, which can help improve content comprehension.

Duolingo (https://www.duolingo.com/) is a language learning application that uses AI techniques to personalize the learning process. The tool adapts tasks and exercises to the student's individual pace and skill level, making learning more effective. Teachers can recommend Duolingo as a complement to traditional language lessons, allowing students to practice language skills in a variety of contexts.

Quizlet (https://quizlet.com/pl) is a platform that enables the creation of sets of learning fiches and various educational games. Using AI, Quizlet can analyze learning progress and adjust materials to maximize memorization. This is particularly valuable for both teachers who want to monitor their students' progress and students who are looking for effective methods of acquiring knowledge.

Each of these tools, based on AI, brings significant facilitation to the world of education, enabling personalized learning, efficiency in teaching and an interactive approach to knowledge acquisition. Their adaptation in schooling and higher education is becoming more widespread, and their benefits are evident at both the individual and institutional levels.

4. Methods

The purpose of the survey was to find out students' opinions on the use of AI-based tools during learning, in classes, and the opportunities and risks that arise from their use. The study used a survey method to collect data. A research tool was developed in the form of an online survey questionnaire. The questionnaire consisted of 9 questions. The questions were of a closed nature with the possibility of entering one's own answer. The stages of the research process are presented in Figure 1.

The main sample group of the study was students of the University of Economics in Krakow. The survey sample consisted of 102 students, of which 77% were female and 23% were male. 65% of the respondents were undergraduate students, and 35% were graduate students. As for the mode of study, 69% were full-time students, and the remaining 31% studied part-time. Among the respondents, the most frequent were students of economic analytics (23%), accounting and controlling (19%), and management (15%). In addition, students of project management, human resource management, international logistics, spatial management, marketing and market communication, and business innovation responded.

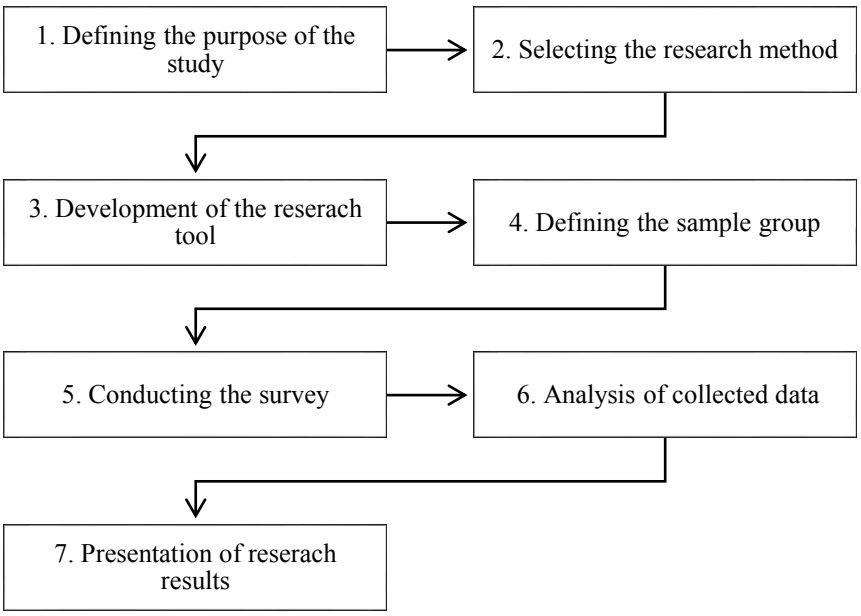

Figure 1. The research process stages.

Source: own elaboration.

The research was conducted in March/April 2024. The results of the study were presented in tables and charts, which included the percentage results of the questionnaire responses obtained. The results shown in the tables have been rounded to the nearest whole.

5. Results and discussion

The development of information technology, including tools based on AI, has revolutionized many aspects of daily life, including education. The article presents the results of a survey of university students to understand how AI-based tools are used by students and how they affect their educational process.

The results of the survey show that students at the University of Economics in Krakow are actively using various AI-based tools (Figure 2).

According to the results shown in Figure 2, ChatGPT is used by 86 respondents, accounting for 84% of the surveyed group. Grammarly, an aid for proofreading texts, is used by 23 students (23%), while Canva, a tool for creating graphics, is used by 58 people (57%). Duolingo, a language learning application, helps 47 respondents (46%), and Quizlet, a platform for creating educational fiches, is used by 63 students (62%).

Students at the University of Economics in Krakow perceive significant difficulties in learning without the support of AI-based tools (Table 1), with 76% stating that the lack of such tools would hinder their learning process. Only 24% see no significant impact of their absence on their educational experience. This underscores the growing dependence on technology in the educational world.

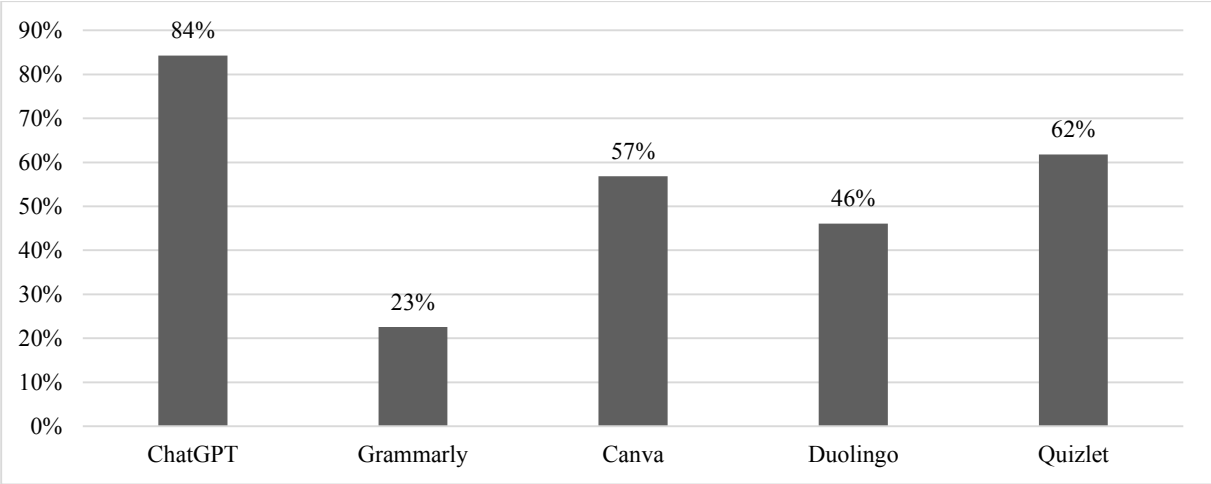

Figure 2. The use of AI tools by surveyed students.

Source: own elaboration.

The vast majority of respondents (95.1%) believe that the use of AI-based tools facilitates their learning process. Only 5% of surveyed students see no difference. These results indicate the important place AI-based tools can have in education, offering support in various aspects of learning.

Table 1.
The role of AI-based tools in learning by surveyed students

Student response	Learning difficulties without AI tools	Facilitating the learning process with AI tools
Yes	76%	95%
No	24%	5%

Source: own elaboration.

The majority of students (81%) are positive about the impact of these tools on the quality of their education (Figure 3). In addition, 14% consider this impact very positive, highlighting the significant role these technologies can play in improving the quality of learning.

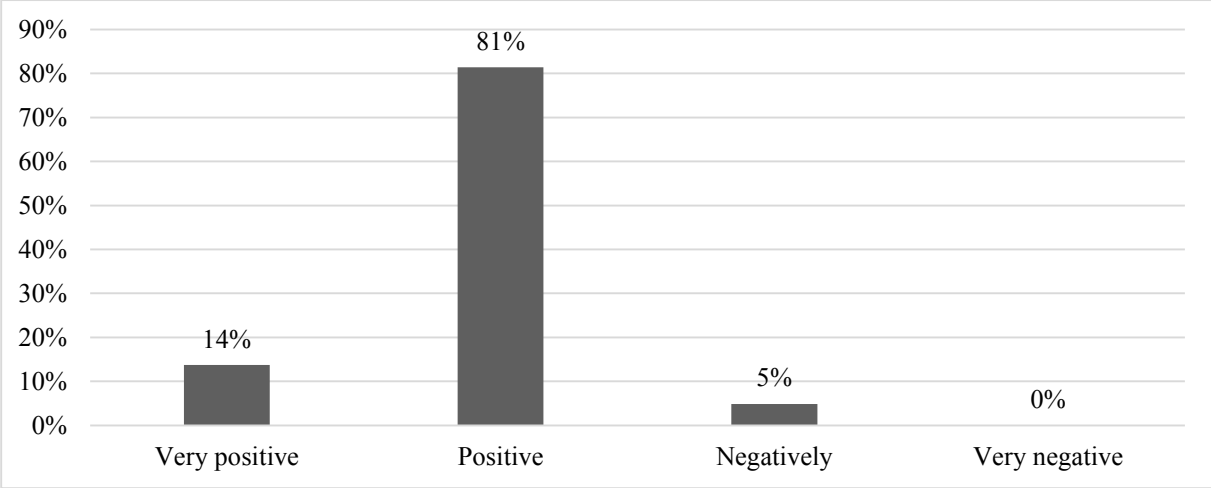

Figure 3. The impact of AI on the quality of education by surveyed students.

Source: own elaboration.

Respondents point to various opportunities associated with the use of AI. 66% of surveyed students point to improved learning efficiency, 40% point to opportunities to individualize learning, and 63% see the development of new teaching methods as an important asset (Table 2). These figures show the potential of AI to innovate in education.

Table 2.
Opportunities associated with the use of AI tools in the educational process

Opportunities	Percentage of student responses
Improving the efficiency of learning.	66%
Individualization of the learning process.	40%
Development of new teaching methods.	63%
Facilitating access to education for people with different needs.	60%
Adaptation of curricula to a rapidly changing world.	60%
I do not see opportunities.	0%

Source: own elaboration.

Despite the many opportunities, students also have concerns about using AI-based tools. The biggest of these are uncertainty about the reliability and integrity of the tools, expressed by 62%, and fear of becoming dependent on the technology and lowering critical competence, which concerns 67% of respondents (Table 3).

Table 3.
Concerns about the use of AI tools in the educational process

Concerns	Percentage of student responses
Concern about losing control over one's own learning process.	27%
Concern about data privacy, especially when collecting and analyzing personal data to tailor educational content to individual student needs.	41%
Uncertainty about credibility and integrity.	62%
Fear of becoming dependent on technology, lowering critical competence	67%
Anxiety about the social and economic consequences of possible exclusion of a group of people.	23%
I don't have any concerns.	2%

Source: own elaboration.

About half of the respondents (54%) indicate that only some teachers use these tools in their classes (Table 4). This may suggest the need for more widespread implementation of these technologies in the teaching process at the university, and, above all, training of lecturers in this area.

Table 4.
Use of AI tools in the classroom

Description of the phenomena	Percentage of student responses
Yes, most teachers use AI tools in the classroom.	0%
Yes, but only some teachers use AI tools in class.	54%
Teachers do not use AI tools in classes.	46%

Source: own elaboration.

Students' responses on the replacement of traditional teaching methods by modern ones (Figure 4) are divided. The majority, or 62%, express an opinion against the complete replacement of traditional methods by AI, emphasizing the value of conventional approaches

in education. However, 38% recognize that AI can fulfill the role of traditional methods, pointing to an evolution in the perception of teaching.

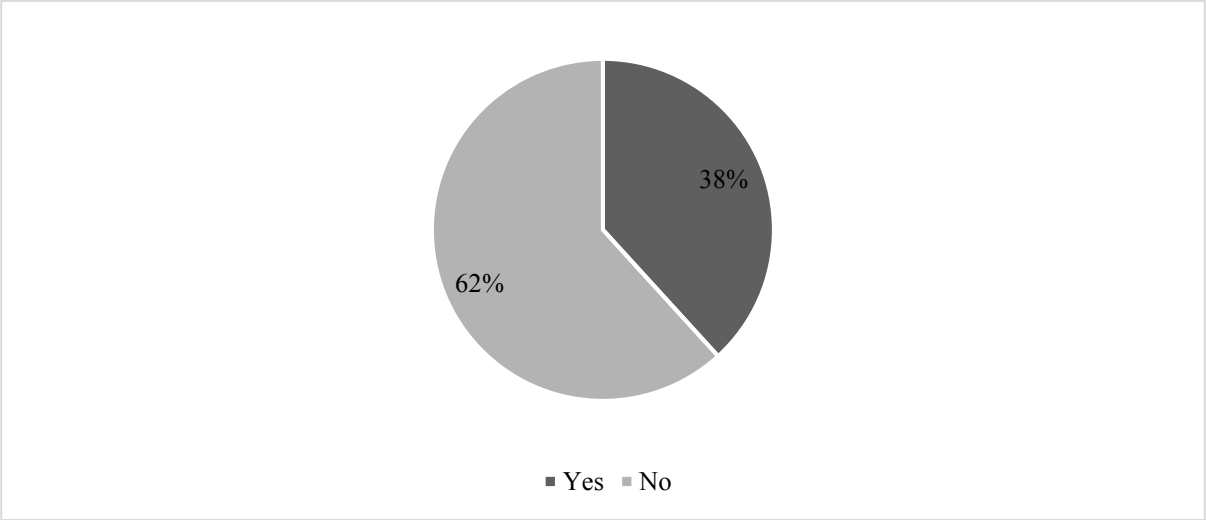

Figure 4. Replacing traditional learning methods with AI by surveyed students.
Source: own elaboration.

Table 4.
Students' opinion on full Introducing AI into the Educational Process

Description of the opinion	Percentage of student responses
Yes, completely.	8%
Yes, with some limitations.	81%
Rather not.	9%
Certainly not.	2%

Source: own elaboration.

Respondents are cautious about the idea of fully introducing AI into the educational process. As shown in Table 4, 81% are in favor of introducing them with some limitations, and only 8% support full introduction. About 12% are against any changes. These data illustrate that while students perceive potential, at the same time they are aware of the need to maintain control over the technological impact on their education.

6. Summary

The survey of students at the University of Economics in Krakow provides valuable insights into how AI-based tools are currently being used in education and the perceived opportunities and challenges of their use. The vast majority of respondents recognize that the use of AI tools facilitates the learning process, highlighting their value as a teaching support. These results clearly indicate a growing reliance on technology in the context of education, with an emphasis on tools such as ChatGPT, Canva and Quizlet, which provide significant assistance in a more effective and engaging educational process.

In addition, the majority of students are positive about the impact of AI on the quality of their education, which may suggest the significant potential of these technologies in raising standards and teaching efficiency. Nonetheless, concerns about credibility, privacy, and the fear of becoming dependent on the technology or lowering critical competence, which were expressed by a significant number of respondents, are a signal to consider the potential negative effects and the need for appropriate regulation and education on the use of these tools.

These findings suggest that universities should not only continue to implement modern AI tools in the teaching process, but also provide training for teaching staff in their effective use. This will allow for a fuller and more informed use of the potential offered by these technologies, while taking care to maintain a critical and ethical approach to education.

First of all, universities could create and implement policies on the transparency of the use of AI tools in education, taking into account the need to openly inform students about how data is collected, processed and used. In addition, universities should consider developing codes of ethics governing the use of AI, which would include rules on privacy and anti-dependency. It is also worthwhile for educational institutions to promote digital literacy courses and training to raise awareness among students and employees about the benefits and risks of AI. Regular audits of AI tools and collaboration with experts in technology law and ethics could ensure that the solutions being implemented comply with best practices and laws. In the context of this study's findings, universities and educational policy makers should also consider strategies to minimize the risks associated with over-reliance on technology and to guarantee equal access to AI-based educational tools for all students. Future research should focus on the long-term effects of integrating AI in education to ensure that its impact is positive for both current and future generations of students.

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