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ASSESSMENT OF THE UTILIZATION LEVEL OF ARTIFICIAL INTELLIGENCE TOOLS IN YOUTH EDUCATION

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ABSTRACT

Purpose: *Artificial Intelligence (AI) is playing an increasingly important role in various areas of life, including higher education. The aim of this article is to assess the level of use of AI tools by students during academic classes and independent learning. It analyzes which available AI tools are used by students in the higher education system. The article also discusses the essence and role of AI development in the context of academic learning.*

Need for the study: *Modern methods and tools of education may be insufficient in the process of educating students. There is a need to search for and offer modern educational tools such as the use of artificial intelligence, which can support academic institutions in monitoring and improving educational processes. Artificial Intelligence tools can contribute to more effective learning and achieving success.*

Methodology: *Research study of students of the University of Szczecin who completed three surveys. The analyzed results concerned their use of the AI tool. You can use Python 3.12 and Pandas libraries*

Findings: *The data obtained indicate that students are increasingly willing to use AI tools, but they have limited trust in them. The results suggest that AI should be a tool supporting student education processes.*

Practical Implications: *AI is influencing the way students teach and learn, and its role in higher education is becoming increasingly important. Effective implementation of AI will require appropriate didactic preparation and a well-thought-out implementation strategy at the level of academic institutions.*

Keywords: academic education, artificial intelligence, education, e-learning

Jel codes: I20, I21, I23, M53 i M59

1. INTRODUCTION

Modern higher education is undergoing dynamic changes, and the growing role of digital technologies is forcing the adaptation of new teaching methods (Dong & Zhang, 2023). Artificial intelligence has become one of the key tools supporting the teaching process, offering personalization of learning, automation of content assessment in an advisory context, and new opportunities for students to interact with educational content. The purpose of this article is to assess the level of use of AI tools by students during academic classes and independent study. The introduction of AI into academic education not only improves the learning process but also affects the way knowledge is processed and analyzed, and thus redefines the traditional approach to teaching.

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In the era of using information pertaining to academic requirements, AI makes it possible to familiarize oneself with the material, personalize the process of learning, and eliminate repetitive and used tasks. The use of AI is becoming a very practical and easy teaching support among other traditional options. One of the most important reasons why students are increasingly using AI tools is that they can access a wide range of knowledge quickly and efficiently. Thanks to intelligent learning platforms, such as thenNavoica.pl (Navoica, 2025) students can acquire knowledge in a variety of fields, tailored to their individual needs. AI algorithms analyze their learning progress provide additional materials to enhance their understanding and learning of a topic (Kowalski & Tomaszewska, 2024).

Personalization of learning based on AI allows the pace and style of learning to be tailored to the user. With respect to traditional teaching methods, where all students learn according to the same pattern, artificial intelligence makes it possible to adapt educational content to the level and requirements of individuals. Such a solution is particularly important for people who expect information in the face of individual expectations and preferences. Students can learn in a manner consistent with their style and basic level using, for example, Khan Academy, Coursera, Udemy which allow the course to be adjusted according to students' performance, or Duolingo, Grammarly which analyze progress in real time.

The use of artificial intelligence is also an opportunity to automate many of the available applications by what is becoming increasingly popular among students. They are eager to use automatic text analysis, grammar and stylistic tools that enable correct editing of texts without linguistic and stylistic errors in academic applications (e.g. credit papers, projects, theses). Thanks to such solutions, students can quickly finalize studies instead of wasting time on laborious text checking. Automatic checking of papers allows students to get immediate detailed feedback on their assignments, which in practice leads to a shorter search for information and a faster learning process.

Artificial Intelligence also provides access to advanced mathematical and engineering analysis.

Technical and scientific research can be used with AI tools for mathematical problems, data analysis and exercises and calculations or modeling. Tools such as Wolfram Alpha, Mathway, Watson, MATLAB, IBM and Symbolab are used here. AI algorithms not only provide ready-made answers, but also explain process solutions step by step, which means the student understands the process.

Another benefit is the improvement of language skills. Students have access to language learning applications based on AI algorithms, such as Duolingo, DeepL or ELSA Speak, allowing them to learn a foreign language, where the system replaces the teacher, and learners can effectively improve their skills in pronunciation, vocabulary or grammar and style, students can also use short translations or text summarization.

SI supports scholars in finding reliable scientific sources, research sources, and managing teaching materials (e.g. Google Scholar, Semantic Scholar.) Examples include ChatPDF, SciSpace, which analyzes and summarizes scientific articles. For students who conduct scientific research, AI becomes an invaluable support for data analysis, literature searches and automation of repetitive applications. Tools such as IBM Watson, SciSpace and ChatPDF enable rapid sharing of relevant information, identification of key content and access to data, correlations between data. Such use of AI results in time savings and automation of routine tasks. With the help of AI tools, students can conduct quick analysis of long text, write papers, and acquire research that would have required the use of traditional labor and time just a few years ago. In a flurry of commitments, their use certainly results in an increase in the efficiency and quality of a student's academic work.

However, when writing about the advantages of using Artificial Intelligence, it would be appropriate to mention that students are exposed to dependence on technology, which limits their ability to act creatively and creatively. The automation of education can be associated with a situation in which students rely on ready-made solutions instead of analyzing problems and formulating conclusions on their own. Nevertheless, artificial intelligence is playing and will continue to play an even greater role in education. As a result, many universities have recognized the need to outline legal and ethical regulations guiding the use of AI, particularly in teaching and research processes. Universities recommend in their regulations how to use artificial intelligence, e.g. for correcting style, linguistic correctness and clarity of text, organizing content; creating tables, charts, diagrams and infographics based on student authorship; making calculations; searching for reliable and verified publications (Dobre praktyki, 2023; Traczyk & msas, 2023; UAM, 2024).

The article consists of six parts. An introduction to the issue and showing the role of artificial intelligence in modern education. Section 2 presents the contemporary application of artificial intelligence tools and their use in education. Section 3 contains the applied methodology of the study, including the characteristics of the group of subjects, the experimental procedure, the measurement tools used and the methods of data analysis. The next section contains the results of the statistical analyses conducted. Section 5 is devoted to the discussion of the results and the possibilities of applying AI tools and supporting learning processes. The final section includes conclusions, practical implications and directions for further research.

2. LITERATURE REVIEW

Artificial intelligence (AI) is a rapidly growing scientific field that finds wide application in almost every area of modern life. It is characterized by interdisciplinary, integrating elements of computer science, statistics, operations research, mathematics, social sciences, philosophy and the humanities. The main goal of artificial intelligence is to design and develop systems, including machines and computers, that are capable of performing tasks previously reserved for humans - tasks that require the use of human intelligence. Today, many human cognitive and decision-making functions can be effectively supported or even replaced by AI systems. Modern artificial intelligence encompasses a number of specialized application areas, such as machine learning, robotics, speech recognition, expert systems and natural language processing. A particularly important and widely implemented segment of AI is machine learning, which is a subfield that uses statistical methods to automatically discover patterns and relationships in large data sets, often processed in real time. An unquestionable advantage of systems based on machine learning is their ability to self-improve, which takes place on the basis of experience gained from analyzing successive data sets. This makes it possible to continuously improve the efficiency and precision of these algorithms in a variety of practical applications.

From the field of Machine Learning (ML), Deep Learning (DL) has been identified as one of the most advanced data processing methods within artificial intelligence. The main applications of DL include image recognition, speech-to-text conversion and prediction of phenomena based on data analysis, among others. Deep learning is based on the architecture of multi-layer artificial neural networks, which enable automatic classification and extraction of patterns from large training data sets. These models mimic the way the human brain works, learning by iteratively solving problems and adapting to complex data structures. It's worth noting that classical machine learning is particularly effective for precisely defined tasks, but requires human supervision and intervention, both in the design and evaluation phases of the model. In contrast, deep learning algorithms exhibit a much higher level of autonomy. They are able to independently assess the quality of their own results, make appropriate adjustments and adapt the internal parameters of the neural network without external intervention.

This kind of ability to self-regulate and learn from hierarchical data representations makes DL applicable to increasingly complex and dynamic environments, where traditional ML methods are becoming insufficient (LeCun et al., 2015).

The development of artificial intelligence (AI) has been characterized by a dynamic evolution from the 1950s to today's highly advanced technologies (Roll & Wylie, 2016). Early research by such pioneers as Alan Turing (Turing, 1950), John McCarthy (McCarthy et al., 2006) or Marvin Minsky (Marvin L. Minsky, 1967), laid the foundation for future work on systems capable of simulating human cognitive processes.

Alan Turing is considered one of the forerunners of the concept of artificial intelligence, and his contribution to the field is reflected, among other things, in a test proposed in 1950, now known as the Turing Test (Turing, 1950). Originally referred to as the "imitation game," this test was an attempt to formulate a criterion for assessing whether a machine manifests intelligence traits comparable to those of humans. The essence of the test was to assess whether a computer could carry on a conversation in such a way that it could not be distinguished from a human. Turing's proposal was one of the first systematic attempts to answer the question of under what conditions a machine can be considered "intelligent." In the following decades, the development of AI went through several important stages - from the early systems based on symbolic algorithms, through the period of intensified research on

neural networks in the 1980s and 1990s, to the current era of deep learning (Deep Learning, 2015; LeCun et al., 2015).

The first attempts to apply artificial intelligence (AI) focused on creating computer programs capable of competing with humans in strategic games known since antiquity, such as chess, checkers and the Chinese game of Go. A pioneering achievement in this area was a program developed by Arthur Samuel, which demonstrated the ability to compete with humans at the amateur level (Samuel, 1959). The term “artificial intelligence” was introduced by John McCarthy at the Dartmouth Conference in 1956, which is considered symbolic of the birth of AI as a scientific discipline (McCarthy et al., 2006).

Since then, AI research has attracted considerable attention from both academia and the private sector. Particular interest in the field has grown following the achievement of three landmark milestones:

1. In 1997, the Deep Blue computer, designed by IBM, defeated chess grandmaster Garry Kasparov, marking the first confirmation that a computer system could outperform a human in a complex strategic game (Campbell et al., 2002).
2. Another breakthrough was DeepMind's development of AlphaGo, which in 2015 was able to beat professional players in the game of Go, a game considered particularly difficult to model algorithmically due to the huge number of possible moves (Silver et al., 2018).
3. The third major achievement was the creation of the AlphaZero system (also by DeepMind) in 2017. This AI system reached the level of grandmaster chess play in just 24 hours, learning solely by playing against itself, and subsequently outperformed the most powerful chess programs of the time (Silver et al., 2018).

The aforementioned milestones have been an important catalyst for the rapid development of artificial intelligence and machine learning (ML) research over the past three decades.

The benefits of implementing AI technologies are particularly evident in the context of management. Modern mobile and smart devices - such as smartphones, smartwatches, tablets, point-of-sale (POS) terminals and IoT sensors - enable the collection of data on demographics, consumer habits and transaction locations in real time. This data, processed by AI algorithms without the need for direct human supervision, allows for dynamic adjustment of supply to demand and anticipation of future market needs including education. The use of AI allows for increased efficiency through robotics and automation, can more accurately identify customer/student/academic needs and adjust product offerings. The flexibility of modern systems makes it possible to deliver personalized services in a shorter time, which translates into work efficiency. Reducing production downtime and increasing competitiveness.

Today, thanks to the increased availability of large data sets and a significant increase in computing power, it has become possible to develop algorithms capable of efficiently analyzing patterns and making decisions based on data (Russell & Norvig, 2021). Modern AI-based systems are used in a wide range of fields, such as medicine, finance, education, as well as in areas related to art and entertainment. However, it should be emphasized that the development of artificial intelligence, despite its many advantages, also generates significant ethical challenges regarding privacy protection and potential impact on the labor market. Consequently, a responsible approach to the implementation and further development of AI technologies requires both careful monitoring by the developers of these systems and adequate regulation by decision makers (Dong & Zhang, 2023).

It is important to note a number of inherent limitations associated with the operation of ChatGPT, which can significantly affect the quality and safety of its application, especially in an educational context. One of the key problems is the model's tendency to generate so-called hallucinations, that is, false or unverified information presented with a high degree of certainty (Alkaissi & McFarlane, 2023). This type of content can mislead users, especially when the tool is used as a source of knowledge or decision support (BaiDoo-Anu & Owusu Ansah, 2023). Moreover, ChatGPT - like other language models learned from large data sets - can reproduce and perpetuate existing biases and stereotypes present in the training data. This bias can lead to the reproduction of discriminatory content or the reproduction of social inequalities, which becomes particularly relevant in the context of creating an equitable and inclusive educational environment (Cooperman & Brandão, 2024). Additionally, there are significant concerns about user privacy and the security of sensitive data. The lack of full transparency about how data is processed, stored and potentially used by technology providers can raise concerns among educational institutions, teachers and students.

The identified limitations point to the need for a prudent and critical approach to the implementation of generative AI tools in education, taking into account both potential benefits and risks (Currie, 2023).

This requires the development of adequate regulatory strategies, ethical frameworks and educational activities aimed at developing critical thinking competencies and informed use of AI-based tools (Akgun & Greenhow, 2022; Celik, 2023).

Artificial intelligence (AI), defined after McCarthy as the science and engineering of creating intelligent machines (McCarthy et al., 2006), is an interdisciplinary field of science (Southworth et al., 2023). The academic discourse on the application of artificial intelligence in higher education shows growing potential for development, but is still in the early stages of formation. Despite the intensifying interest in the topic, there are a limited number of empirical studies verifying the actual effects of integrating AI tools into educational practices, which significantly hinders the formulation of evidence-based recommendations for academic institutions (Al-Emran et al., 2025). Currently, due to the widespread use of AI in education (Adiguzel et al., 2023; Śluzek & Suppan, 2024) Many studies have been conducted related to the degree of its use and the extent of its application in education (Ouyang et al., 2022).

We can find an interesting overview in Belkina's study (Belkina et al., 2025). The author shows an overview of 21 empirical studies that noted the advantages of using Generation AI in educational settings, both by teachers and students indicating, for example, the improvement of learning methodologies (Rudolph, J. , Tan, S. , Tan, S., 2023), curriculum development (Simms, 2024) the use of broad educational resources (Akanksh Reddy Muddam, 2023; Cheah et al., 2025).

Students pointed to the possibility of individualization in learning (Mhlanga, 2023), facilitating improved learning by answering theoretical questions, stimulating creative thinking, summarizing complex essays in comprehensible formats, and serving as an editing tool to help students with weak language skills (Michel-Villarreal et al., 2023). It is also important to learn how to use the new GenAI tools, as they can help students learn to work more efficiently, accurately and make further progress (Nikolic et al., 2024).

Based on an analysis of the literature, it can be concluded that artificial intelligence is widely used in various fields, and higher education institutions recommend its use in the teaching and research process (BaiDoo-Anu & Owusu Ansah, 2023). Nevertheless, the research to date does not provide clear answers to the question of how students actually use the available AI tools - whether they are able to use advanced, specialized solutions tailored to the specifics of the field, or whether they are mainly limited to freely available applications such as ChatGPT. Obtaining in-depth knowledge in this regard could bridge the gap and provide a basis for designing effective educational programs aimed at developing competence in the informed and appropriate use of artificial intelligence tools (Al-Emran et al., 2025; Barus et al., 2025).

The literature emphasizes that education in the field of artificial intelligence plays an important role in shaping ethical understanding of data generated by AI systems and is an important part of preparing students for future professional functioning in a digitally driven society (Chan & Tsi, 2024; Creely & Blannin, 2025; Singh et al., 2022). Artificial intelligence is rapidly transforming teaching and learning processes in higher education, bringing about significant changes. Academic staff, students, and educational institutions alike are facing challenges and new opportunities, as well as ambiguities and concerns about the role of AI in the educational environment. It is still unclear to what extent the technology should be integrated into teaching practices, and to what extent it should be restricted. University authorities are therefore faced with the need to develop an adequate regulatory framework and guidelines to effectively manage the implementation of AI in a way that balances technological innovation with ethical requirements and academic integrity (Lyu et al., 2025). In this regard, it is interesting to see what attitudes students have towards artificial intelligence tools.

According to a study conducted by Our Future Foundation and Kozminski University's educational foundation (*Raport-Edukacyjny-PL.Pdf*, n.d.), conducted with 1128 Polish students, almost two-thirds of them use generative artificial intelligence (GEN AI) when solving homework assignments and creating academic projects. Students mostly believe that universities should allow the use of new technologies in the educational process, but with clear regulations on their use. When studying for exams or preparing for papers required to pass a course, more than 52 percent of Polish students use artificial intelligence-based tools, such as Chat GPT or Bard, using large language models (LLMs). In addition, nearly 63 percent of students believe that Chat GPT helps them solve academic problems or search for needed information faster.

From another study “Technology through the eyes of a student” conducted by Digital Care (*Badanie*, 2023), which was carried out on a sample of 500 students aged 19–35 the report conducted by we can learn that as many as 68% of students say they will use tools using artificial intelligence while studying during the academic year. Possible applications included language translation (52%), organizing work (52%), creating presentations (50%) and writing credit papers (34%). One in five students plans to write a thesis with the support of artificial intelligence: an undergraduate, engineering or master's degree, it added. According to the survey, 20% of students have a strongly positive view of the use of artificial intelligence in the educational process during their studies, 40% rather positively, 30% neither positively nor negatively, 8% rather negatively, and 2% - definitely negative. When asked about their willingness to develop competence in the use of artificial intelligence in university classes, 31% of respondents answered “definitely yes,” 43% “rather yes,” 15% “neither yes nor no,” 8 percent “rather not,” and 2% “definitely not.”

Another very interesting study is a survey of 23,000 students from 109 countries, which shows that artificial intelligence, specifically ChatGPT, has become an important tool to support higher education (Ravšelj et al., 2025). ChatGPT is used by students most often for brainstorming and generating ideas (29%) – students use AI for inspiration, creating new concepts and solving problems, summarizing long texts (27%) – the tool helps in quick comprehension of extensive material, finding information for scientific articles (25%) - students use AI as a support in data collection and preparation of academic content. Other popular uses (about 20% of students) also included assistance in writing scientific papers, repeating material before exams, translating texts, seeking advice on personal matters, writing programming code, proofreading texts. Less popular uses included writing official texts, solving math assignments, literary creativity (such as writing short stories or poems). Students find ChatGPT a useful tool for simplifying complex information.

However, students are aware of its limitations, such as the possibility of generating false information (so-called “AI hallucinations”). Two-thirds of respondents believe that privacy should be protected when using ChatGPT, while 50% of students suggest that universities should set rules for the use of AI. The survey shows that ChatGPT is increasingly being used as a tool to support learning, but not as a main source of knowledge. Students mainly use it to organize information, summarize content and inspire themselves, but they are aware of the risk of errors generated by AI.

As the above analysis indicates, artificial intelligence tools are eagerly used in education. Since its public release on November 30, 2022, ChatGPT's generative artificial intelligence tool has gained more than one million users in just one week. Its advanced capabilities for complex tasks have sparked global interest and surprise, especially in educational contexts. ChatGPT's potential to support teaching processes has been met with ambivalent reactions from teachers, as the technology is highly transformative and could significantly change existing teaching models. The potential benefits of using AI tools in education include supporting personalized and interactive learning, creating tasks and prompts for formative assessment, as well as providing ongoing feedback to support the teaching and learning process. Therefore, there is a need for interdisciplinary cooperation between representatives of university administration, academia, educational practitioners and technology specialists to develop safe and effective strategies for implementing generative AI tools in higher education.

3. METHODOLOGY

3.1. Participants

This study was based on data collected through three surveys. The first two surveys were conducted during the spring semester of 2023 and 2024, respectively. Students who participated in the surveys were first-year students of the bachelor's degree who were taking a Python programming course at the University of Szczecin. At the end of the semester, students were asked if they had used outside help during the duration of the course. The third survey was conducted during the spring semester of 2025, and the participants were second-year students of the bachelor's degree and last-year students of the master's degree at the University of Szczecin. This survey asked respondents about the tools they used during their last semester, if they used any AI tools, and about their trust in the information the AI provided. Participants in all surveys were of different genders. 55 students took part in the first survey, 62 in the second, and 23 in the third survey. In total, 140 people took part in the study.

3.2. Research Protocol and Stimuli

As not to limit the answers from students in the first two surveys, the question concerning the learning aids was in the form of an open-answer question. For that reason, the data had to be categorized manually. In the end, all the students' answers were classified into nine groups: websites, information services, online courses, AI, books, peer support, and others. Then anonymized data was analyzed using Python 3.12 and Pandas library. To make the output more readable, it was visualized in graphs.

3.2. Research Apparatus

Python is a high-level programming language, whose design philosophy focuses on code readability. It is relatively easy to use, with various libraries for scientific purposes. This makes Python a powerful tool for data analysis. It allows researchers to extract valuable information from a large dataset. Pandas is considered an example of and specialized Python library for data manipulation (Mihai ANDRONICEANU, 2025).

It allows for fast and easy data analysis. In this research, Python 3.12 with Pandas 2.2.3 library was used for analyzing data from the surveys and to present the results in the form of graphs.

4. RESULTS

In an era of increasing digitization and widespread access to online resources, the ways in which students use additional means to support their learning are changing rapidly. Therefore, the research conducted will provide an understanding of what tools students use in the educational process and how their preferences have evolved over the 2023-2025 period. The following analysis details the results of each study and its implications for the future of academic education in the age of increasing digital technologies.

On Figure 1, the data from the first survey from year 2023 is presented. . Most of the students (36%) who participated in the survey declared to use websites as study help. Interestingly, almost as many students 35% not declared to use any outside help at all. In the third place were both information services and online courses, with 15% of students mentioning their use. AI was placed fourth, used by only 11% of students, followed by use of books (9%) and other (9%). The least mentioned was peer support, mentioned only by 5% of the respondents.

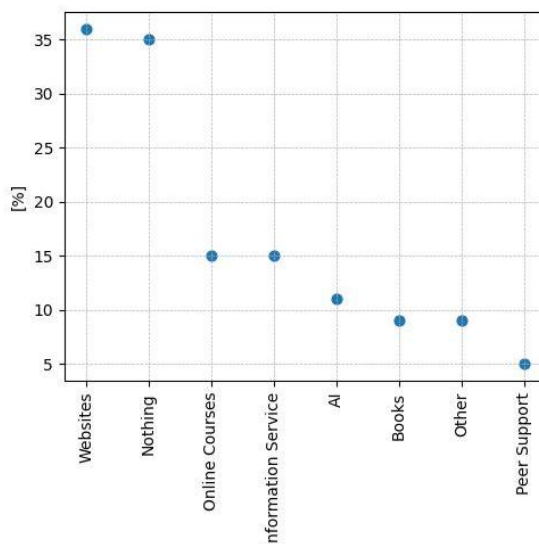
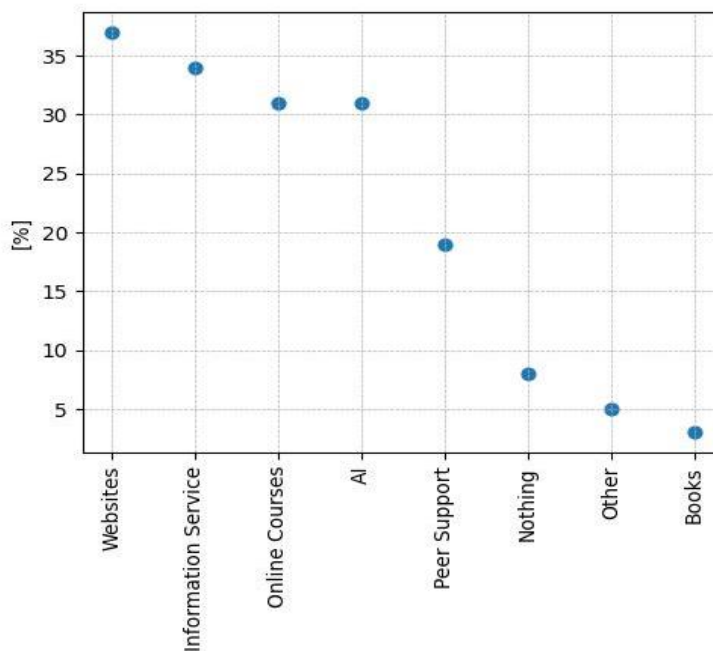


Figure 1. The outside help declared to be used by students in the spring semester of 2023

Source: own elaboration.

Figure 2 shows the results of the second survey from the year 2024. Like previously, first place is taken by the declared use of websites as study help with 37% of respondents mentioning it. But this time the second place is taken by information services, with 34% of students declaring its use. Both AI and online courses were ranked third, with 31% of students mentioning them. This is a significant increase compared to the previous year. Following was peer support (19%), which was previously the least popular among students. This time, only 8% of students declared that they had not used any help during the course, 5% used other tools, and 3% searched for help in books.

Figure 2. The outside help declared to be used by students in the spring semester of 2023



Source: own elaboration.

The third survey from 2025 included three questions:

Q1: Did you use any additional learning aids? If so, which ones?

Q2: How often have you used artificial intelligence tools (e.g., ChatGPT) in your studies?

Q3: Do you agree with the following statement: "I trust the results returned by tools using artificial intelligence (e.g., ChatGPT)?"

Figure 3 illustrates the answers of students to the first question described above. This time more than half of the students (70%) mentioned the use of AI as study help. There are also visible decreases in the use of any other help with information services and other tools being mentioned by only 13% of responders. Websites, which were the most used previously, are now mentioned by only 9% of students.

Furthermore, online courses as well are now mentioned merely by 9% of students. Peer support, books, and no use of any additional study help were only declared once each (4%).

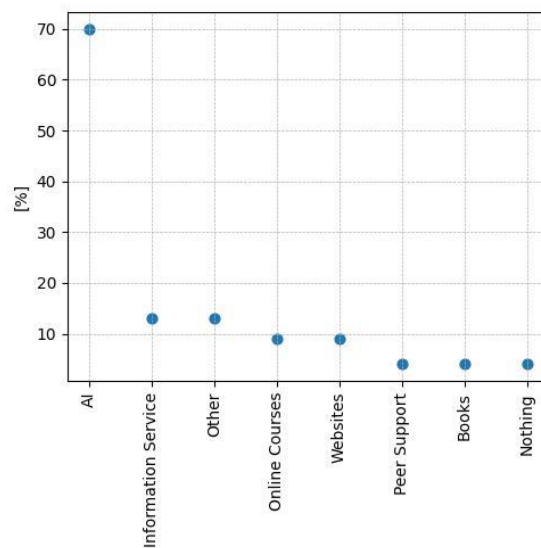


Figure 3. Answers to Q1: “Did you use any additional learning aids? If so, which ones?”

Source: own elaboration.

The answers to the second question of the third survey are presented in Figure 4. Here, 57% of participants characterized the frequency of use of the AI tools as “occasionally”. 26% of students selected “frequently” both “very frequently” and “almost never” were picked by 9% of respondents each, and none of the students declared to never use the AI tools.

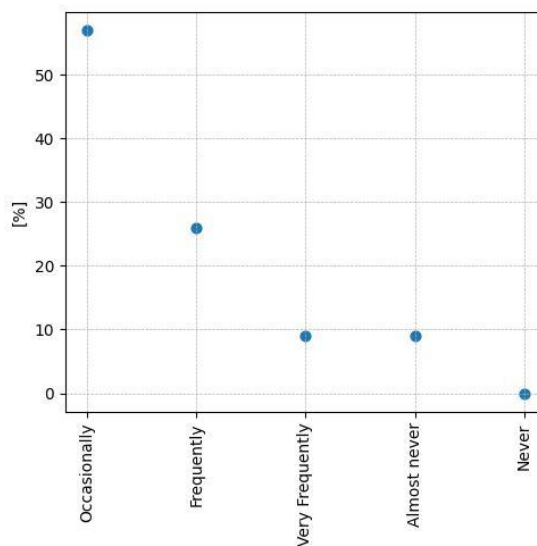


Figure 4. Answers to Q2: “How often have you used artificial intelligence tools (e.g., ChatGPT) in your studies?”

Source: own elaboration.

Students’ answers to the last question from the third survey are shown in Figure 5. Although most students said that they use AI tools, with “occasionally” and “frequently” being the top two answers, 39% of the participants disagreed with trusting the results provided by these tools and 13% of them strongly disagreed. 30% of the respondents agreed with the statement; 17% were undecided. None of the respondents strongly agreed with that statement.

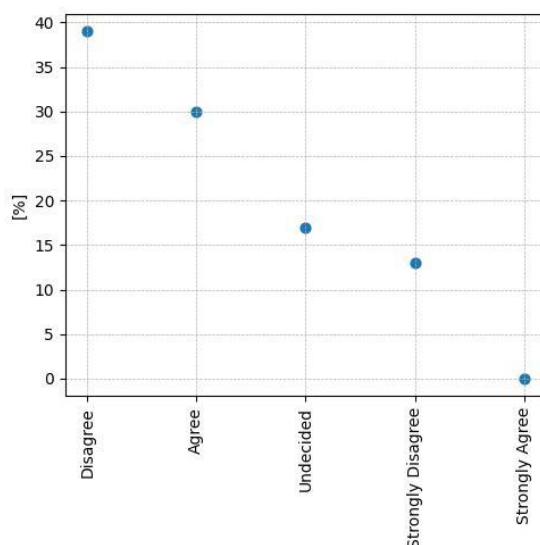


Figure 5. Answers to Q3: “Do you agree with the following statement: “I trust the results returned by tools using artificial intelligence? (e.g., ChatGPT)?”

Source: own elaboration.

5. DISCUSSION

Analysis of the results of the three surveys conducted shows a clear change in the ways in which students use additional educational tools. In 2023, traditional sources such as websites dominated, and almost half of the students surveyed did not use any additional aids. In 2024, a significant increase in the popularity of AI tools such as ChatGPT and information services was noted, which began to compete with traditional learning methods.

The most dynamic change occurred in 2025, when artificial intelligence became the dominant tool to support learning - more than half of respondents reported using it. However, despite the rise in popularity of AI, students do not trust it unconditionally. Half of the respondents do not believe in the full correctness of the information returned by AI, which may indicate a critical attitude towards these tools.

The rise in popularity of AI may be related to its increasing accessibility and effectiveness in providing quick answers to programming questions. Despite this, the survey results indicate that students do not show complete confidence in the information generated by AI. Half of the respondents expressed skepticism about the correctness of the results returned by AI tools, which may suggest that despite its growing use, students are still using it critically.

Artificial intelligence is already influencing the way students teach and learn, and its role in academic education will grow in the coming years (Woolf, 2009). The analysis showed that AI tools are increasingly being used by students, both in class and in self-study. However, their successful implementation requires adequate didactic preparation and a well-thought-out implementation strategy at the level of academic institutions. It is also important to pay attention to ethical issues and data privacy restrictions. The future of AI in higher education looks promising, but its successful adaptation requires conscious action at the level of universities and decision-making bodies (Selwyn, 2019).

The undisputed benefits of using AI in learning include personalizing the learning process, saving time and automating routine tasks, supporting science, facilitating access to knowledge and scientific sources, and improving language skills. The possibilities for using AI tools are essentially limitless. The use of these tools in day-to-day work/study will certainly contribute to better organization of learning and management of free time.

6. CONCLUSION

The results of the survey clearly indicate a dynamic transformation in the way students use available educational tools. Over the past three years, a clear shift in user preferences has been observed - from traditional sources of information, such as books, textbooks and classic websites, towards tools based on artificial intelligence (AI). Solutions such as educational chatbots, content recommendation systems, intelligent assistants or text generators are beginning to play an increasingly important role in everyday teaching practice, both in the context of self-learning and formal teaching.

This does not mean, however, that the process is completely seamless. The empirical data collected reveals the simultaneous presence of certain reserves and limited confidence in IS technology. Students, despite the increasing availability and functionality of these tools, often remain skeptical about the quality of the content they generate and their usefulness in the learning process. These concerns may be related both to the lack of transparency of the algorithms and the risk of erroneous or incomplete information, which may lead to the reproduction of false beliefs or the simplification of complex issues.

In view of the above, it seems reasonable to call for in-depth studies aimed at a long-term assessment of the impact of implementing artificial intelligence on the teaching process. Of particular importance here is the need to determine how new technologies affect the efficiency of learning, the development of students' independence and the formation of cognitive competencies. It would also be important to identify teaching strategies that can support students in the conscious, critical and effective use of AI-based tools.

From the point of view of contemporary educational challenges, it is also crucial to study the impact of these technologies on the development of critical thinking skills. In an era of information overload, the ability to analyze, verify and select content is becoming a competency as important as subject knowledge. AI-based tools can both support this process - for example, by generating alternative viewpoints or personalizing materials - and disrupt it if used unreflectively or as a substitute for traditional forms of learning.

In conclusion, the implementation of AI technologies in education should be regarded not only as a natural stage in the development of teaching tools, but also as a complex phenomenon requiring systematic research and critical reflection. This is because it is necessary to create a theoretical and practical framework that will enable the effective use of the potential of these technologies while minimizing threats to the quality of the educational process.

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