

The Use of Artificial Intelligence Tools by Students: Opportunities and Challenges

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Abstract

This study aims to explore the use of artificial intelligence tools among students, focusing on both the opportunities and challenges associated with their integration into academic activities, as well as the variability of usage patterns across different student profiles. The research adopts a quantitative design based on a structured questionnaire administered to a sample of 215 students from the University of Bucharest and Valahia University of Târgoviște. The instrument evaluates two main dimensions: the frequency and type of AI usage, and the perceived utility and benefits of these tools in the learning process. The results indicate that the year of study represents the most significant factor influencing both the frequency of AI usage and the perceived utility of these tools ($p = .001$ and $p = .000$, respectively), with third-year students demonstrating the highest levels of engagement and efficiency in AI use, while first-year students show lower levels of utilization. In contrast, variables such as age, level of study, and specialization do not produce statistically significant differences, suggesting a relatively homogeneous adoption of AI tools across these categories. The findings highlight that artificial intelligence functions as a widely accessible and democratized educational resource, supporting productivity, information processing, and academic task completion. At the same time, the study emphasizes the need for structured institutional support, particularly in the early stages of academic training, as well as the importance of promoting responsible and ethical use of AI to mitigate risks related to overreliance, information accuracy, and academic integrity.

Keywords: *Artificial intelligence, challenges, digital tools, opportunities, students.*

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Introduction

The use of artificial intelligence tools among students has become an increasingly widespread phenomenon, driven by the rapid development of digital technologies and the high accessibility of AI-based applications. In the context of contemporary education, these technologies are no longer perceived solely as auxiliary tools, but as resources integrated into daily academic activities, influencing the way students learn, write, and process information (Ouyang & Jiao, 2021; Lincă, Matei, 2024; Anghel et al., 2025). From a theoretical perspective, the use of artificial intelligence can be analyzed through the lens of technology adoption models, which highlight the role of perceived usefulness and ease of use in shaping user behavior. The model proposed by Fred Davis (1989) emphasizes that the adoption of a technology is significantly influenced by users' perceptions of its benefits and by the degree to which it is considered easy to use. This theoretical framework is relevant for analyzing how students use artificial intelligence tools in academic activities.

In this regard, recent studies show that students frequently use artificial intelligence for tasks such as content generation, explaining concepts, and organizing information. According to Olaf Zawacki-Richter et al. (2019), AI-based applications contribute to the personalization of learning and to increasing the efficiency of academic activities by providing support tailored to the individual needs of users. One of the main advantages of using artificial intelligence tools is the increase in academic productivity. AI-based systems enable the rapid completion of tasks and provide solutions in a short time, facilitating workload management and optimizing the learning process (Lincă, 2019). Studies conducted by Kasneci et al. (2023) highlight that generative models can support students in drafting assignments and structuring information, contributing to the improvement of academic outcomes.

Furthermore, artificial intelligence provides significant opportunities in terms of access to information and the diversification of knowledge sources. According to Dirk Ifenthaler and Yau (2020), data-driven and AI-based technologies can support learning processes by providing personalized feedback and facilitating decision-making

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in educational contexts. However, the use of artificial intelligence tools also involves a number of important challenges. One of these is related to the level of trust in the information generated. Although these systems provide fast and coherent responses, they may produce errors or incomplete information, which requires the development of students' critical evaluation skills (Budişteanu, Lincă, Andrei, 2022; Kasneci et al., 2023).

In addition, the literature highlights ethical issues associated with the use of artificial intelligence in academic settings. The possibility of automatically generating content raises concerns regarding academic integrity and the misuse of digital resources. In this regard, Deborah Cotton et al. (2023) emphasize the need to develop clear educational policies to regulate the use of these technologies.

Another relevant aspect is the risk of excessive use of artificial intelligence, which may lead to a decrease in students' active involvement in the learning process. The frequent use of these tools can encourage the adoption of automation-based strategies, to the detriment of complex cognitive processes. In this context, Michael A. Peters et al. (2023) emphasize the need to develop a balanced relationship between the use of technology and students' cognitive engagement.

At the same time, it is important to highlight that artificial intelligence operates based on algorithmic data-processing mechanisms and does not generate knowledge autonomously. Therefore, the responsibility for the proper use of information remains with the user, which underscores the importance of digital competencies and critical thinking in the educational environment (Cîrstea, 2025).

Therefore, the use of artificial intelligence tools by students involves a duality between opportunities and challenges. On the one hand, these technologies contribute to increased efficiency and facilitate access to information, while on the other hand, they raise issues related to ethics, accuracy, and technological dependency. These dimensions form the conceptual foundation of the research and are reflected in the analyzed variables, such as frequency of use, perceived benefits, level of trust, and encountered challenges.

Research methodology

Sample

The research cohort consists of 215 students affiliated with the University of Bucharest and "Valahia" University of Târgoviște, providing a representative cross-section of the academic population within the field of educational sciences.

Regarding the demographic distribution by age, the data reveals a notable bimodal concentration. The primary segment is composed of young adults aged 20–25 years (41.9%), reflecting the traditional student trajectory. However, a significant proportion of the sample is represented by the over-35 category (37.2%), indicating a robust presence of non-traditional students engaged in lifelong learning or professional reconversion. Conversely, the cohorts aged under 20 (9.3%), 31–35 (7.0%), and 26–30 (4.7%) exhibit lower frequency, suggesting that the sample is characterized by a juxtaposition of early-career students and mature learners (Table 1).

The academic profile of the participants demonstrates a balanced distribution between the two main cycles of higher education. Bachelor's degree candidates account for 53.5% of the total, while Master's degree students comprise 46.5%, ensuring that the findings encapsulate perspectives from both foundational and advanced levels of professional training. An analysis of the year of study indicates that first-year students represent the largest plurality (27.9%). This is followed by a consistent distribution among fourth-year, fifth-year (each at 23.3%), and third-year students (20.9%), whereas the second-year cohort shows a markedly lower participation rate of 4.7% (Table 1).

In terms of disciplinary specialization, the sample is exclusively drawn from the educational sciences, yet it maintains internal diversity. The plurality of respondents is enrolled in Special Psychopedagogy (39.5%), while Pedagogy and Primary and Preschool Education Pedagogy each account for 30.2% of the participants. This balanced representation across specific sub-fields allows for a comprehensive analysis of the pedagogical training provided by the two university centers, facilitating an integrated understanding of the

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professional identity and academic development of future educators and specialists (Table 1).

Table 1. Socio-Academic Profile of the Research Sample (N=215)

Variable Category	Indicator (Subcategory)	Frequency (N)	Percentage (%)
Age Group	Under 20 years old	20	9.3%
	20 - 25 years old	90	41.9%
	26 - 30 years old	10	4.7%
	31 - 35 years old	15	7.0%
	Over 35 years old	80	37.2%
Level of Study	Bachelor's Degree	115	53.5%
	Master's Degree	100	46.5%
Year of Study	Year 1	60	27.9%
	Year 2	10	4.7%
	Year 3	45	20.9%
	Year 4	50	23.3%
	Year 5	50	23.3%
Specialization	Special Psychopedagogy	85	39.5%
	Pedagogy	65	30.2%
	Primary and Preschool Pedagogy	65	30.2%
TOTAL		215	100%

Objectives and hypotheses

Research Objective

The primary objective of this study is to conduct a comparative analysis of AI adoption patterns in academic learning environments. Specifically, it seeks to examine whether significant differences exist

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among students based on their demographic profile (age) and academic status (level of study, year of study, and specialization) regarding:

- The frequency and typology of AI tool utilization.
- The perceived utility and educational benefits of AI in the academic process.

Research Hypotheses

The central hypothesis of this research posits that there are significant differences in the patterns of adoption and the perceived value of AI in academic learning based on student segmentation variables. This general hypothesis is operationalized through the following specific sub-hypotheses:

H1: It is hypothesized that students in the 20–25 age group exhibit a higher frequency of AI usage, primarily for content generation, whereas students over 35 years old prioritize AI for time efficiency and the synthesis of complex information related to lifelong learning.

H2: Master's degree students are expected to report a higher perceived utility of AI for scientific research and advanced data synthesis compared to Bachelor's degree students, who utilize AI predominantly for foundational conceptual clarification.

H3: Students in terminal years (3, 4, and 5) demonstrate a more sophisticated application of AI tools (e.g., structuring theses, data analysis) compared to first-year students, whose usage remains largely exploratory.

H4: Students specializing in Special Psychopedagogy identify specific benefits of AI in adapting educational materials for special needs, whereas students in Pedagogy and Primary/Preschool Education utilize AI mainly for instructional design and creative lesson planning.

Instruments

The instrument employed in this research was a structured questionnaire, specifically developed to capture the dynamics of Artificial Intelligence utilization within the university environment, grounded in established literature on technology acceptance models (Castaneda & Selwyn, 2018; Du Boulay, 2000; Edtech, 2020; Facione, 2020; Hennekeuser et al., 2024; OECD, 2021; Kvetenska & Myska, 2017; Vieriu & Petrea, 2025). The questionnaire comprises a

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total of 40 items, designed to evaluate two fundamental dimensions: on one hand, the frequency and type of AI usage, and on the other, the perceived utility and benefits of these tools in the learning process, with each dimension represented by 20 items. To ensure precise data collection, a 5-point Likert scale was utilized, where respondents assessed their level of agreement or frequency across a spectrum ranging from 1 (to a very small extent) to 5 (to a very great extent).

The content validity and academic rigor of the instrument were guaranteed through an interdisciplinary approach during the design stage. A panel of experts, including a special psychopedagogue, a pedagogue, and an educational psychologist, contributed to the formulation of the items, ensuring that the questions accurately reflect the realities of the teaching-learning process and the specific needs of students in the field of Educational Sciences. Following the conceptual phase, the instrument underwent a linguistic review and proofreading process conducted by a professional translator, an essential step to eliminate terminological ambiguities. In its final form, the questionnaire was administered to the sample of 215 students from the University of Bucharest and "Valahia" University of Targoviste, providing a robust database for subsequent statistical analyses.

Procedure

The data collection process was executed through a quantitative approach, utilizing a structured questionnaire as the primary instrument, distributed digitally via the Google Forms platform. This method was selected to ensure increased accessibility and to facilitate participation from students at both targeted academic centers: the University of Bucharest and "Valahia" University of Târgoviște.

The collection phase was preceded by an instrument validation stage, where items pertaining to the two central dimensions were defined: *frequency and type of AI usage*, and *perceived utility and benefits*. Participants were recruited through convenience sampling, with the access link distributed through both official and informal university communication channels (student social media groups and e-learning platforms). Prior to completing the survey, respondents navigated an informed consent section, which guaranteed anonymity

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and data confidentiality. To ensure the integrity of the database, the "limit to one response" feature was enabled, and all items were set as mandatory. This resulted in a complete dataset for all 215 respondents, with no missing values. Subsequently, the responses were exported and numerically coded for statistical processing in SPSS.

Results

The data analysis began by testing the distribution of the primary variables. According to Table 2 (One-Sample Kolmogorov-Smirnov Test), the distribution of scores for "frequency and type of use" (Mean = 16.41, Std. Deviation = 5.32) and "utility and benefits" (Mean = 17.44, Std. Deviation = 5.31) deviated significantly from a normal distribution ($p = .000$ in both cases). This asymmetry necessitated the use of non-parametric tests to analyze the differences between groups.

Table 2 One-Sample Kolmogorov-Smirnov Test

		frequency.and. type.of.use	utility.and.ben efits
N		215	215
Normal	Mean	16,419	17,442
Parameters ^{a,b}	Std. Deviation	5,3269	5,3184
Most Extreme	Absolute	,104	,146
Differences	Positive	,104	,129
	Negative	-,064	-,146
Test Statistic		,104	,146
Asymp. Sig. (2-tailed)		,000 ^c	,000 ^c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

Regarding the level of study, data in Table 3 shows that Bachelor's students had a higher mean rank for frequency of use (113.11) compared to Master's students (102.13). This trend persisted for perceived utility (109.09 vs. 106.75). However, the Mann-Whitney U test in Table 4 demonstrates that these differences are not statistically significant, reporting a Z-coefficient of -1.295 at a p-value of .195 for frequency, and a Z-coefficient of -.277 at a p-value of .781 for utility. Thus, students exhibit a relatively homogeneous AI usage behavior regardless of their academic cycle (H1).

Table 3 Ranks – U Test

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	level.of.study	N	Mean Rank	Sum of Ranks
frequency.and.type.of.use	Bachelor's degree	115	113,11	13007,50
	Master's degree	100	102,13	10212,50
	Total	215		
utility.and.benefits	Bachelor's degree	115	109,09	12545,00
	Master's degree	100	106,75	10675,00
	Total	215		

Table 4 Mann-Whitney U^a

	frequency.and.type.of.use	utility.and.benefits
Mann-Whitney U	5162,500	5625,000
Wilcoxon W	10212,500	10675,000
Z	-1,295	-,277
Asymp. Sig. (2-tailed)	,195	,781

a. Grouping Variable: level.of.study

The analysis of the age variable (Tables 5 and 6) indicates that the 20-25 years old group holds the highest mean rank for utility (64.11), while the under-20 group has the lowest mean rank (49.88). Nevertheless, the Kruskal-Wallis test indicates that age is not a significant differentiating factor, with a Chi-Square value of 2.142 ($p = .343$) for frequency of use and 4.049 ($p = .132$) for perceived utility (H2).

Table 5 Ranks - Kruskal Wallis Test 1

	age	N	Mean Rank
frequency.and.type.of.use	under 20 years old	20	59,88
	20-25 years old	90	62,31
	26-30 years old	10	45,50
	Total	120	
utility.and.benefits	under 20 years old	20	49,88
	20-25 years old	90	64,11
	26-30 years old	10	49,25
	Total	120	

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Table 6 Kruskal Wallis Test^{a,b}

	frequency.and. type.of.use	utility.and.ben efits
Chi-Square	2,142	4,049
df	2	2
Asymp. Sig.	,343	,132

a. Kruskal Wallis Test

b. Grouping Variable: age

The determining factor in this research proved to be the year of study. According to Table 7, major variations in mean ranks were recorded: 3rd-year students showed the highest interest in AI utility (140.50), while 2nd-year students led in frequency of use (135.50). Conversely, 1st-year students reported the lowest scores (mean rank of 83.63 for utility). Table 8 confirms the robustness of these differences via the Kruskal-Wallis test, obtaining high Chi-Square values (18.223 for frequency and 22.600 for utility) at very high significance levels ($p = .001$ and $p = .000$, respectively) (H3).

Table 7 Ranks - Kruskal Wallis Test 2

	year.of.study	N	Mean Rank
frequency.and.typ e.of.use	1,0	60	92,79
	2,0	10	135,50
	3,0	45	135,22
	4,0	50	91,25
	5,0	50	113,00
	Total	215	
utility.and.benefit s	1,0	60	83,63
	2,0	10	120,50
	3,0	45	140,50
	4,0	50	103,75
	5,0	50	109,75
	Total	215	

Table 8 Kruskal Wallis Test 2^{a, b}

	frequency.and. type.of.use	utility.and.ben efits
Chi-Square	18,223	22,600
df	4	4

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b. Grouping Variable: year.of.study

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into the academic environment is not influenced by demographic factors (age) or structural factors (level of study, specialization), but is closely linked to the stage of the academic journey (year of study).

The ability to recognize the utility and benefits of AI appears to develop progressively as students advance through their degree cycles, peaking in the 3rd year. This can be explained by the increasing complexity of academic tasks—such as drafting bachelor's theses or research projects—which require advanced tools for synthesis and analysis. The fact that age and level of study (Bachelor vs. Master) did not produce significant differences suggests a phenomenon of "technological democratization." Both mature students (over 35) and younger ones, whether at the start of their training or in a master's program, perceive AI as a universal utilitarian tool. This indicates a widespread need for digital literacy and a broad openness toward new technologies among future educators.

In conclusion, although specializations like Special Psychopedagogy could theoretically offer specific niches for AI use, in practice, students across all investigated fields utilize these resources similarly. This underscores the need to implement unified educational policies regarding the ethical and efficient use of AI in Romanian universities, with a particular emphasis on supporting students in their early years who currently exhibit lower levels of engagement. The results of the present study provide a nuanced understanding of how Artificial Intelligence (AI) is being integrated into the Romanian pedagogical academic landscape. A primary finding of this research, which constitutes a significant element of originality, is that the adoption and effective use of AI are not primarily driven by biological age or the specific level of study (Bachelor's vs. Master's), but rather by the academic maturity associated with the stage of the degree cycle.

The peak in AI utilization and perceived utility observed in the 3rd year of study suggests that the "academic necessity"—driven by the increasing complexity of tasks such as drafting bachelor's theses and conducting independent research—acts as the main catalyst for technological adoption. This finding challenges the traditional "digital native" narrative, suggesting that purposeful, strategic use of AI tools is a learned academic behavior rather than a generational trait. Furthermore, the lack of significant differences between older students

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(over 35) and younger cohorts points toward a "technological democratization" effect. In this context, AI serves as a leveling tool, providing universal utilitarian support that transcends previous digital experiences, a phenomenon that aligns with the "digitization of higher education" framework discussed by Castaneda and Selwyn (2018).

The interdisciplinary nature of the research instrument—developed by a panel of experts in special psychopedagogy, pedagogy, and educational psychology—allowed for a deeper exploration of how AI facilitates the understanding and assimilation of information. While general perception remains positive across the board, the significant differences found in relation to specialization (specifically in the cognitive assimilation of data) highlight that AI is not a "one-size-fits-all" solution. For instance, the specific needs of Special Psychopedagogy students in adapting materials for diverse learners reflect the "promises and implications" of AI noted by Holmes et al. (2019). However, the lower levels of engagement found among first-year students represent a critical gap. This suggests that without early institutional guidance, the potential of AI as a "cognitive partner" remains underutilized during the foundational years of teacher training. Consequently, this study underscores the urgent need for unified educational policies in Romanian universities that promote AI literacy from the very beginning of the academic journey.

Building upon these conclusions, several avenues for future inquiry are proposed. First, longitudinal studies are needed to track student cohorts from their first year through the completion of their Master's degree to observe the longitudinal evolution of AI-mediated learning strategies. Second, future research should move beyond self-reported data to correlate AI usage with objective academic performance metrics, such as grade point averages or the qualitative rigor of research projects. Additionally, a promising direction lies in exploring the role of AI as assistive technology within Special Psychopedagogy, investigating how future educators might leverage these tools to support students with special educational needs. Finally, as the field matures, investigating the ethical dimensions and academic integrity concerns from the students' perspective will be crucial for developing a balanced and responsible framework for AI integration in the Romanian higher education system.

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