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Percepţiile studenţilor privind utilizarea inteligenţei artificiale în procesul educaţional: beneficii şi provocări

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STUDENTS' PERCEPTIONS ON THE USE OF ARTIFICIAL INTELLIGENCE IN THE EDUCATIONAL PROCESS: BENEFITS AND CHALLENGES

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Abstract
In recent decades, the evolution of digital technologies, along with the emergence of artificial intelligence, has brought significant changes to the education system. In a world where artificial intelligence (AI) has revolutionised the educational process by offering students round-the-clock support – through its ability to generate content, solve assignments, or draft essays rapidly – teachers are constantly seeking solutions to provide learners with the most effective learning resources, to develop authentic competencies tailored to everyone's needs. The present study, primarily quantitative with a complementary qualitative component, investigates the perceptions of first-, second-, and third-year students enrolled in the Primary and Preschool Education Pedagogy study program at George Emil Palade University of Medicine, Pharmacy, Science, and Technology of Târgu Mureş. The study aims to identify how students use AI in their educational activities. Data were collected through an online questionnaire created in Google Forms, which consisted of both closed- and open-ended questions, and was administered in December 2025. The findings revealed that students primarily use artificial intelligence to write essays and presentations, solve assignments/projects, perform translations, and prepare for exams. Furthermore, participants stated that AI helps them save time during their

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studies, better understand difficult content, and develop critical thinking. Additionally, the study highlights students' attitudes toward academic integrity and notes their need for a clear guide on the use of AI in the academic environment. Overall, the study pinpoints the benefits and risks of using Generative AI tools among higher education students. While most respondents use GenAI tools for academic purposes weekly to save time while learning, a small number of students reported using them only 1-2 times per week. Regarding ethical issues and academic integrity, 54% of students understand the proper use of GenAI tools, while 25% report a partial understanding of the regulations. Further investigation is needed to accurately understand the effect of Gen AI tools on students' long-term learning.

Keywords: academic integrity, AI effect, artificial intelligence, digital technology, educational process.

Rezumat

În ultimele decenii, evoluţia tehnologiilor digitale şi apariţia inteligenţei artificiale au adus schimbări importante în sistemul educaţional. Într-o lume în care inteligenţa artificială (IA) a revoluţionat procesul educaţional, oferind studenţilor suport non-stop, ca urmare a posibilităţii de a genera rapid conţinut, de a rezolva teme sau de a redacta eseuri, cadrele didactice caută constant soluţii pentru a le oferi cele mai optime surse de învăţare, în vederea dezvoltării unor competenţe reale, adaptate nevoilor individuale ale fiecăruia în parte.

Prezentul studiu, predominant cantitativ, cu o componentă calitativă complementară, investighează percepţiile studenţilor din anii I, II şi III de la programul de studiu Pedagogia Învăţământului Primar şi Preşcolar din cadrul UMFST G.E. Palade din Târgu Mureş, pentru a identifica modul în care aceştia utilizează IA în activitatea lor educaţională, combinând tehnici cantitative şi calitative pentru a obţine o viziune mai profundă asupra fenomenului. Datele au fost colectate cu ajutorul unui chestionar elaborat online pe platforma Google Forms, compus din întrebări închise şi deschise, şi administrat în luna decembrie 2025. Rezultatele obţinute indică faptul că studenţii utilizează cu precădere inteligenţa artificială pentru a redacta eseuri şi prezentări, a rezolva teme şi proiecte, a realiza traduceri şi a se pregăti pentru examene. Mai mult decât atât, participanţii la studiu au afirmat că IA îi ajută să economisească timp la studiu, să înţeleagă mai bine conţinuturile dificile şi să îşi dezvolte gândirea critică. Totodată, studiul evidenţiază atitudinea studenţilor faţă de integritatea academică, aceştia exprimând necesitatea elaborării unui ghid clar privind utilizarea IA în mediul academic.

În concluzie, studiul evidenţiază beneficiile şi riscurile utilizării instrumentelor de IA în rândul studenţilor din învăţământul superior. Deşi majoritatea respondenţilor folosesc instrumentele IAGen săptămânal în scopuri academice

pentru a economisi timp în procesul de învăţare, un număr limitat de studenţi au raportat că le folosesc doar de 1-2 ori pe săptămână. În ceea ce priveşte problemele etice şi integritatea academică, 54% dintre studenţi înţeleg utilizarea corectă a instrumentelor IA, în timp ce 25% raportează o înţelegere parţială a reglementărilor. Este necesară o investigaţie suplimentară pentru a înţelege corect efectul instrumentelor IAGen asupra învăţării pe termen lung a studenţilor.

***Cuvinte-cheie**: efectul IA, integritate academică, inteligenţă artificială, proces educaţional, tehnologie digitală.*

1. Introduction

In recent years, the use of Generative AI tools (GenAI), such as ChatGPT, Grammarly, Canva, Gemini, and others, has revolutionised today's society, transforming education and the way information is transmitted, understood and used. ChatGPT, one of the most widely used large language models, has gained recognition and is used worldwide by millions to answer simple questions or find information on various topics. Among teenagers, ChatGPT is used as an educational tool to help them solve complex problems, write essays or reviews, or simply get advice on life-related issues. ChatGPT, version 4 (Rawas, 2024), has become one of the most widely used AI-driven tools, with 180 million monthly users, owing to its cross-disciplinary importance (Singh, 2025). It is a fine-tuned GPT model that is free for use (Bozkurt, 2023) and enables users to create content and find answers and solutions to their problems.

Moreover, another AI-enhanced design tool is Canva, which improves students' engagement, creativity, and academic performance by enabling them to create educational materials (Jamaludin & Sedek, 2024). A qualitative study performed by Pedroso et al. (2023) examined how students relate to Canva as an educational tool. The findings highlighted that students perceive Canva as a user-friendly tool for creating visually engaging presentations. A meta-analysis of 22 studies performed by Astańo (2025) found that using Canva among students can lead to significant improvements in their academic performance.

Similarly, Google Gemini, a multimodal generative AI tool, is used by students to generate audio, video, text and images, enabling students to learn more efficiently (Imran & Almusharraf, 2024). Another study by Majidah et al. (2025) involving 45 undergraduate students investigated how university students perceive Gemini as a learning tool. Most of the students felt that Gemini helped them understand course materials much better, was very easy to use, and had a user-friendly interface. The authors concluded that the tool is excellent and can be easily used in higher education environments. In their quasi-experimental study, Elhag et al. (2025) examined whether the use of Generative AI tools in educational contexts had a positive influence on students' academic performance and on their motivation to learn. The research, based on tests and questionnaires, found that students who used GenAI tools achieved higher test scores than those who did not. The study also emphasised that the use of these tools did not significantly alter students' motivation to learn.

From a teacher-centred perspective, GenAI can be a tool that promotes student independence, but it may also cause them to lose their ability to solve problems and think critically in different circumstances. From a student-centred perspective, the use of technological resources allows students to transform their learning habits and master new techniques. AI-driven tools allow students to personalise and improve their learning and explore new ways to enhance their knowledge.

Education is one of the fields that has been greatly influenced by the use of artificial intelligence. According to Bikanga Ada (2024), the instructional effectiveness, the support, and students' capacity to use AI have been questioned as it has become an integrated part of the educational system. As stated by Fleischmann (2024), these technologies promote autonomous learning, offer personalised learning experiences, and therefore can enhance academic efficiency.

However, students' perceptions of these tools vary significantly, as some are unsure whether GenAI can provide the best answers to their questions. Others question whether the information received is valid and can be trusted, or whether it can be included in papers, articles or a final thesis. A study conducted in Hong Kong (Chan & Hu, 2023) highlighted that even when

students were satisfied with the integration of AI in education, they were also cautious about how educators incorporate these tools into their daily teaching. Thus, regulations have been developed, and UNESCO (2023) has also issued recommendations on how people should use and integrate GenAI into their teaching and daily lives to maintain human safety. According to a 2023 survey of 1,800 undergraduate students from 15 countries conducted by Chegg (2023), 40% reported using GenAI in their studies. Although they stated that the answers they receive are accurate, 47% of current users are concerned that GenAI offers them inaccurate information.

While there are studies that focus on the use of AI tools among higher education students, there is limited research on how these tools are used by students from the Pedagogy of Primary and Preschool Education study program. Thus, little is known about how future kindergarten or primary school teachers perceive the use of Generative AI tools in their studies and how this use influences their academic activities.

The study focuses on future kindergarten and primary school teachers, who will play an important role in developing the next generation by integrating GenAI tools into the educational process. Therefore, the respondents' perceptions and practices regarding the use of these technologies will directly influence their academic journey and teaching. Since preschool and primary school education is considered critical to young children's development, the appropriate use of GenAI tools by their educators can significantly affect it. Thus, the aim of the present research is to investigate higher education students' perceptions from the Pedagogy of Primary and Preschool Education study program related to GenAI and to find an answer to the following research questions:

RQ1. To what extent are GenAI tools used by higher education students from the Pedagogy of Primary and Preschool Education study program?
RQ2. When and for what academic activities do students from the Pedagogy of Primary and Preschool Education study program use GenAI tools?
RQ3. How does GenAI influence higher education students' learning habits from the Pedagogy of Primary and Preschool Education study program?
RQ4. Are students from the Pedagogy of Primary and Preschool Education study program aware of the ethical implications of GenAI tools?

2. Literature review

Generative AI tools, or simply GenAI tools, are AI-driven technologies that create content by using natural-language requests from users. They can also produce images, music, videos, social media posts, and any other requested content (UNESCO, 2023). The use of artificial intelligence became widespread during the COVID-19 pandemic when traditional classroom teaching was transferred to online learning (Mijwil et al., 2022). Since then, GenAI has significantly changed the paradigm of higher education by offering students the ability to solve problems, write essays, create presentations, and, moreover, enhance their academic performance (Kishore et al., 2023). From tools that help students generate accurate writing to those that help them personalise their learning, education in the 21st century has changed radically. GenAI-driven tools help students improve their writing abilities (García-Martínez et al., 2023), foster creativity (Bender, 2023) and promote a deeper academic engagement (Weng et al., 2024; Zouhaier, 2023). According to Bates et al. (2020), AI-powered learning systems, such as Coursera, edX or Udemy, adapt their content to each student's needs and level of knowledge, offering them customised courses and rapid feedback. GenAI tools can also be useful for teachers, enabling them to perform assessment tasks more easily. Plagiarism detectors and automated grading systems help educators provide comprehensive feedback quickly and efficiently (Ilma & Sampurna, 2024; Swiecki et al., 2022).

In recent years, multiple studies have examined university students' perceptions, awareness, and usage patterns of GenAI. Numerous research studies examined students' satisfaction with the use of GenAI tools and revealed mixed feelings among the surveyed participants. On one hand, students are satisfied with the use of these tools as they can help them simplify certain tasks and enhance productivity. A study conducted in Vietnam with 200 students highlighted a positive attitude among learners toward integrating ChatGPT into teaching and learning (Ngo, 2023). In their qualitative study, Shuhaiber et al. (2024) highlighted that students are positively engaged in using chatbots for research and completing their homework, but they also reported missing human interaction, which is significantly important for learning. Sousa and Cardoso (2025) conducted a quantitative study using

a questionnaire to assess students' perceptions of GenAI. The study revealed that most of the students used GenAI tools for summarisation and data analysis, while many found ChatGPT useful for planning and conducting research for essay writing.

However, despite positive reactions, studies have found significant concerns about the long-term use of GenAI tools and their effect on academic integrity. Thus, in a survey of 1,091 participants, Baek et al. (2024) found that students use GenAI tools for writing and research tasks. However, the results indicated that the lack of institutional support made students avoid using these tools. The use of GenAI tools has also affected students' learning outcomes. Studies performed in this respect highlighted that students are more engaged in learning, as these tools provide simplified versions of the content that help them understand the subject more easily. Furthermore, these tools offer them greater independence but may affect their critical thinking and memorisation skills. Zafar et al. (2024) conducted a quantitative study based on a questionnaire administered to 345 university students, to highlight the effect of GenAI tools on their learning outcomes. The results showed that students used these tools for writing assignments because they were highly efficient; however, their critical thinking and independent research skills were reduced as they relied mainly on content generated by AI. GenAI tools are widely used by higher education students to conduct research and to help with writing or learning tasks.

Moreover, Jacobs-Basadien et al. (2025) found that students became more dependent on GenAI tools, leading to decreased memorisation skills, as learning with these tools does not support long-term retention of information, which may lead to academic failure. In their research, Vieriu and Petrea (2025) investigated how AI-driven tools influence university students' learning outcomes and academic results. Conducted among 85 second-year students at the National University of Science and Technology Politehnica Bucharest, the study found that students use AI technologies for personalised learning and great learning outcomes, but overuse of these tools diminishes their critical thinking and leads them to engage in academically dishonest practices. Additionally, Dragomir and Todorescu (2025) investigated through a questionnaire survey how students at the Politehnica University of Timişoara perceive GenAI tools and their effects on their learning activities. The study

included 292 undergraduate students from nine faculties and found that learners consider these tools beneficial, but, as other studies have suggested, expressed concern about their future effect on their learning outcomes. Similarly, Rădoi et al. (2025) highlight the risk that students overuse GenAI tools, which may lead to reduced critical thinking. Moreover, the author suggests that students may find balance in using AI-generated content and human support.

Ethical issues and academic integrity are also widely debated in the context of the use of GenAI tools. Uppal and Hajian (2025) conducted a survey of 44 undergraduate participants from the Psychology Department at Kwantlen Polytechnic University, Canada. The results of the study emphasised students' concerns regarding ethical issues, such as plagiarism and the authenticity of content they create using GenAI technologies. The study suggests that universities should implement clear policies to help students use AI tools responsibly. The same ethical concerns were identified in studies by Hadinejad et al. (2025) and Batista et al. (2024), in which students highlighted their fear of being accused of plagiarism. Another study found that even when students were enthusiastic about using GenAI tools, they were concerned about the ethical implications (Chan & Tsi, 2024). Academic integrity and ethical issues are real concerns, and researchers emphasise the need for clear guidelines and policies to ensure the responsible use of AI-generated content among university students (Andrade-Girón et al., 2024; Gligorea et al., 2023; Rădoi et al., 2025).

Current research indicates that GenAI tools are highly used in research and assessment among higher education students (Andrade-Girón et al., 2024; Bower et al., 2024). Students expressed concern that AI may facilitate cheating (Chan & Hu, 2023) or lead to unintended consequences (Batista et al., 2024).

3. Materials and methods

3.1. Research design

The present study, primarily quantitative with a complementary qualitative component, is based on an online questionnaire administered to students

enrolled in the Pedagogy of Primary and Preschool Education study program in years I, II, and III at George Emil Palade University of Medicine, Pharmacy, Science and Technology of Târgu Mureş. The questionnaire consists of seven sections, totalling 36 questions, of which five pertain strictly to demographic data. The questions were formulated to assess students' perceptions of technology and digital competencies, AI usage patterns and their influence on learning, AI accuracy, academic and ethical integrity and recommendations and needs. The questions in the survey were developed by the author after reviewing and analysing several studies in this field to ensure they were relevant to the study. The students received all necessary information regarding the study, its use and importance, and, by answering the online questionnaire, they provided their consent to participate. Names and any additional personal information were not collected. As all participants answered all questions in the questionnaire, no one was excluded from the study. The questionnaire was accessible to all enrolled students across the three cohorts (N = 125); 100 students responded, yielding an 80% response rate. Although the questionnaire was developed based on existing literature on this topic, neither formal pilot testing nor validation using external methods was conducted.

3.2. Research sample

Students from the Pedagogy of Primary and Preschool Education study program, years I, II, and III, at George Emil Palade University of Medicine, Pharmacy, Science and Technology of Târgu Mureş, were invited to participate in the study. A total of 100 students completed the questionnaire in full. Participants were aged 18–19 years (n = 25), 20–22 years (n = 63), 23–26 years (n = 8), and above 27 years (n = 4). Based on the data, the mean age is 20.94 years, and the standard deviation is 2.12 years. The demographic data includes participants' gender, age, place of residence and study year. Most respondents (99%) were female, as girls predominate in this study program. The only male student (1%) also completed the questionnaire. Of the students who completed the questionnaire, 59% are from rural areas, whereas 41% are from urban areas (see Table no. 1).

Table no. 1. *Demographic information*

Sample characteristics	Full sample
	n
Gender	
Male	1
Female	99
Age range	
18–19	25
20–22	63
23–26	8
Above 27	4
Place of residence	
Urban	41
Rural	59
Study year	
I year	43
II year	34
III year	23

Note. N = 100.

3.3. Research instrument

An online questionnaire was used to collect data, making the process more efficient and less time-consuming. The questionnaire contains sections on demographic data and students' perceptions of GenAI tools, their use, effect on learning, accuracy and reliability and academic integrity and ethical issues. The survey comprises open- and closed-ended questions, as well as statements that were assessed on a 5-point Likert scale. Participants were given all necessary information before completing the questionnaire, including an estimated completion time. The survey was administered online via Google Forms within the first half of the 2025–2026 academic year. As all respondents completed the questionnaire, no one was excluded from the study.

3.4. Procedure

Both quantitative and qualitative analyses were used to assess students' perceptions of GenAI's use in the educational process. Students' use of

GenAI was surveyed to determine how often, why, and in what circumstances students from the Pedagogy of Primary and Preschool Education study program use GenAI tools.

For the quantitative analysis, a descriptive study was used to summarise the data. Percentages were calculated to offer a clearer outline of the distribution of responses. For the qualitative analysis, the responses offered to open-ended questions were analysed thematically after being manually coded by the researcher. The manual coding involved assigning thematic labels to data segments and organising them into categories. This type of analysis was chosen as it allows the identification of specific themes and patterns within the data and enables a thorough understanding and examination of these patterns.

3.5. Statistical analysis

Data from the Excel spreadsheet was analysed after cleaning and coding. All 100 questionnaires were complete and were therefore retained for analysis. Categorical variables were summarised as absolute frequencies and percentages. Ordinal variables, including Likert-scale items, were additionally summarised using medians, interquartile ranges, means, and standard deviations.

For inferential analysis, ordinal response options were numerically coded in ascending order. Agreement items were coded from *total disagreement* (1) to *total agreement* (5). Acceptability items were coded from *completely unacceptable* (1) to *completely acceptable* (5). Frequency of GenAI use, level of trust, frequency of verification, perceived clarity of rules, and willingness to use institutionally supported GenAI tools were coded as ordinal variables. Multiple-response questions were decomposed into both binary indicators for each selected option and count variables reflecting the number of tools, contexts, tasks, verification methods, or institutional measures selected by each respondent.

Composite scores were calculated for theoretically related item groups: perceived learning benefit, instrumental learning benefit, affective benefit,

perceived dependency/reduced effort, acceptability of supportive GenAI use, and acceptability of high-risk GenAI use. The internal consistency of these composite scores was assessed using Cronbach's alpha. All scales demonstrated acceptable reliability values ($\alpha > 0.70$). Composite scores were calculated by averaging the responses corresponding to each construct. These scores were used to interpret the study results. Exploratory principal component analysis was used to assess whether the items within each scale loaded on a common latent dimension. Associations between ordinal variables were assessed using Spearman's rank correlation coefficient. Differences between study years and residence groups were assessed using Kruskal–Wallis tests. Associations between categorical variables were assessed using chi-square tests or Fisher's exact tests when expected frequencies were small. Effect sizes were reported using Cramér's V, epsilon-squared, or odds ratios with 95% confidence intervals, as appropriate. For the main correlation matrix, false discovery rate correction was applied using the Benjamini–Hochberg procedure. Statistical significance was interpreted at a two-sided $p < 0.05$, with adjusted q-values reported for multiple correlation testing. Gender was not used as a grouping variable because the sample was almost exclusively female.

4. Results and Discussion

4.1. Access to technology and GenAI skills

A total of 100 students (99 females and 1 male) filled in the survey via Google Forms. To clearly assess students' use of GenAI tools, it was important to evaluate their digital competencies and determine whether they are familiar with GenAI and have participated in a course on its use.

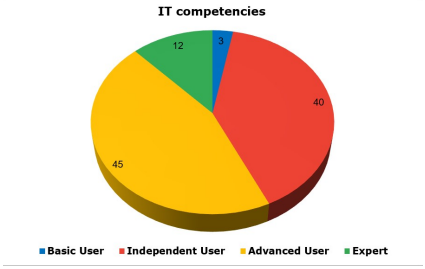

Figure no. 1. *Students' IT competencies*

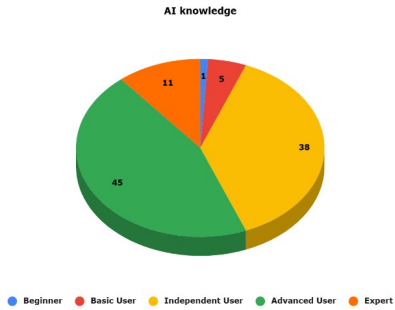

Figure no. 2. *Students' GenAI knowledge*

According to the responses, 45% of participants reported possessing advanced IT competencies, whereas only 3% reported having basic skills. Regarding students' knowledge of GenAI use, 45% are advanced users, and only 1 student reported being a basic user (see Figure no. 1). Furthermore, 86% of respondents reported not having taken a course on the use of GenAI, while 6% reported attending courses on the proper use of GenAI tools (see Figure no. 2).

4.2. GenAI use among respondents

The most important section of the questionnaire contained closed-ended questions with a multiple-response approach, and it was designed in order to find out as much as possible about students' use of GenAI tools, the type of tool they usually use, the frequency they use them, the purpose, the context and the type of work for which they use it. It was also important whether they used the tools most of the time when dealing with assignments, rather than only occasionally. According to Figures no. 3 and no. 4, 98% of students use GenAI for things related to university work to learn (72), create/write a project (68), write essays (37), prepare for exams (51), create presentations (47), and create lesson plans (28). Only 5 respondents stated that they use GenAI tools for other purposes, which are not related to university tasks.

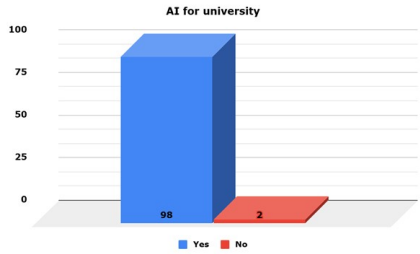

***Figure no. 3**. GenAI use among respondents*

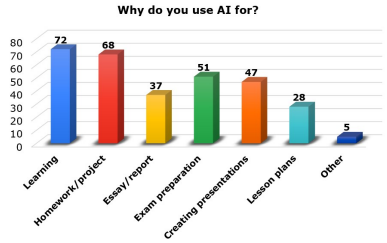

***Figure no. 4.** Purpose of GenAI tools*

These data are essential, as they provide a clear answer to RQ2 regarding when and for which academic activities higher education students use GenAI tools, thus allowing us to assess how GenAI tools are applied across different fields.

The frequency of GenAI use was also questioned, and the analysis of the survey highlighted that most of the respondents (45%) use the tools on a weekly basis, 32% use them 3–5 times per week, and only a slight percentage (4%) use them 1–2 times per month. The data suggest that students use it regularly, which is not at all surprising, taking into consideration the widespread use of GenAI tools among the population (see Figure no. 5). GenAI tools are readily accessible to most students, which explains their frequent use among respondents. The findings are essential as they can clarify how these technologies are included in the educational process across different fields. To examine students' engagement with GenAI tools, the results in Figure no. 6 indicate that most respondents (92) prefer ChatGPT to other available tools. The list is followed by Canva (52) and Google Gemini, Copilot and Claude (28). Less frequently, students use DeepL (9), and some respondents (3) mentioned using other tools as well. As the students are following a study program that prepares them to become kindergarten and primary school teachers, it is understandable that DeepL, a tool primarily used for translation, is not widely used among the population surveyed.

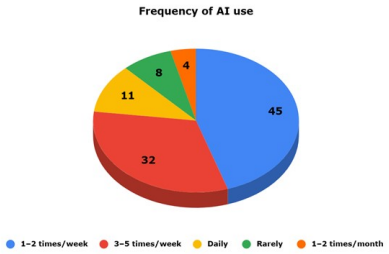

Figure no. 5. *Frequency of GenAI use*

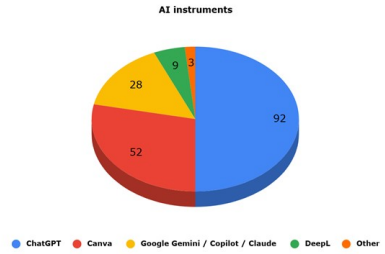

Figure no. 6. *GenAI instrument*

In recent years, students have become dependent on GenAI tools, using them regularly for their academic work. When asked how much they rely on GenAI tools, 51% of students in the Pedagogy of Primary and Preschool Education study program reported relying moderately, and 24% reported relying only in certain cases. On the other hand, 20% of respondents reported using GenAI tools frequently, while 2% reported using them very frequently (see Figure no. 7).

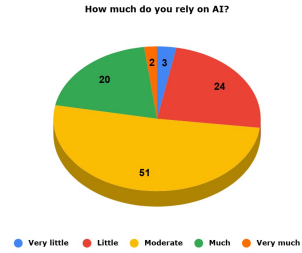

Figure no. 7. *Students' reliance on AI*

4.3. Effect of GenAI on learning outcomes

Artificial intelligence has transformed the educational system and the way students learn and engage with their subjects. GenAI tools provide students with continuous support in a short period. The questionnaire aimed to shed light on students' views on the effect of GenAI tools on their learning performance.

GenAI tools are generally seen as time-saving resources that help students to structure their learning. Thus, most respondents (39% agreement, 16% total agreement) reported that GenAI tools can help them save time while learning, whereas only a small number (8%) were in total disagreement (see Figure no. 8). Moreover, GenAI is regarded as an effective assistant that can help respondents understand complex concepts. In this respect, most students (46% agreement, 27% total agreement) agreed that GenAI offers concise clarifications on difficult content. Again, only a small portion (7%) disagrees with the efficiency of GenAI tools (see Figure no. 9). The data obtained is crucial, as it allows us to understand how the use of GenAI platforms affects the academic performance of future kindergarten and primary school teachers.

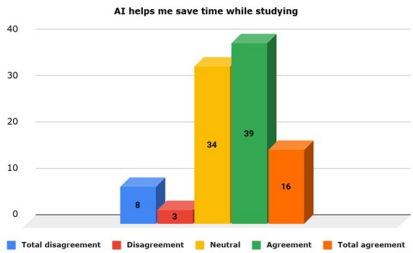

Figure no. 8. *GenAI tools as time-savers*

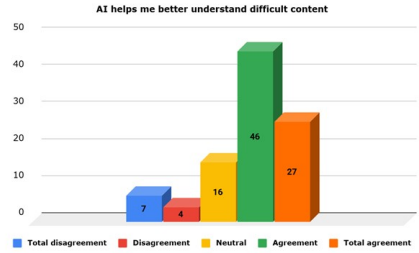

Figure no. 9. *GenAI tools as assistants*

Furthermore, GenAI tools can adjust explanations to students' current knowledge. This is why most students (45% agreement, 26% total agreement) believe these tools offer them explanations tailored to their level of understanding.

A small group (7%) believe that these tools are not effective for them (see Figure no. 10). At the same time, GenAI tools can provide students with ideas and help them structure their work. Once again, almost all students (47% agreement, 27% total agreement) agreed that GenAI tools are effective in helping them organise their tasks (see Figure no. 11). Motivation is a key factor for students, influencing their engagement with their work and academic persistence. Figures 12 and 13 highlight students' beliefs about whether GenAI tools can help them stay motivated and can reduce their

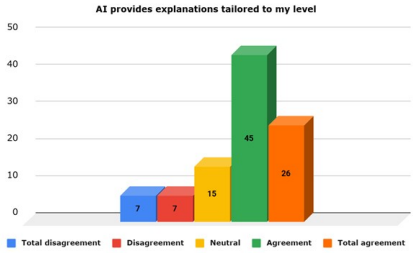

Figure no. 10. *GenAI offers tailored explanations*

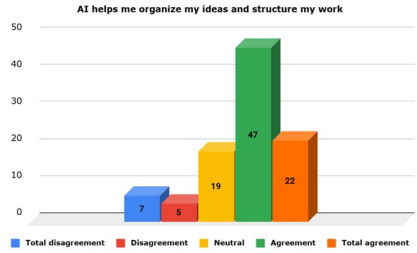

Figure no. 11. *GenAI as a work organiser*

anxiety and stress levels before exams. Of these, 47% of respondents (neutral) are unsure whether these tools can positively affect their motivation, whereas 13% (moderate agreement) consider them valuable assets for increasing it. The same is to be observed when we talk about stress and anxiety reduction. Most students (32% neutral, 21% in agreement) do not see a significant role for GenAI tools in reducing their stress and anxiety levels before assessments.

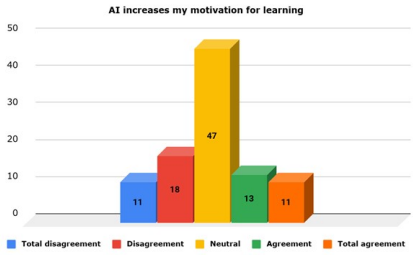

Figure no. 12. *The role of GenAI in increasing motivation*

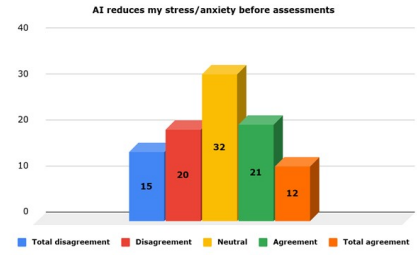

Figure no. 13. *The role of GenAI in reducing stress and anxiety*

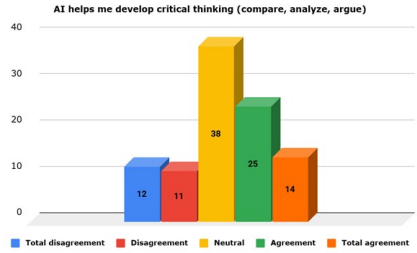

Figure no. 14. *GenAI and critical thinking*

Due to technological advancements, critical thinking has become essential in the 21st century. Most students (25% in agreement, 14% in total agreement) consider GenAI tools important for developing their critical thinking, whereas a smaller percentage (12%) believes these cannot support this area (see Figure no. 14). This result appears to contradict findings from the existing literature, which suggest that the use of GenAI tools may diminish critical thinking (Vieriu & Petrea, 2025; Zafar et al., 2024). A possible explanation for this contradiction might be the profile of the students who completed the survey. As future kindergarten and primary school teachers, students might consider these AI tools as a cognitive platform that allows them to explore new perspectives and focus more on higher-order thinking, such as analysing, synthesising, or evaluating information. Moreover, regarding dependence, most students (35% neutral, 29% disagree) believe that GenAI tools do not reduce their autonomy. Only a small proportion (1% in total agreement) considers that these tools generate dependency and reduce autonomy (see Figure no. 15). For some students, GenAI tools appear to be the best instrument for completing academic tasks without diminishing their personal effort, while 25% of respondents remain neutral and 24% agree. On the contrary, only a few students (13%) strongly disagree with this statement (see Figure no. 16).

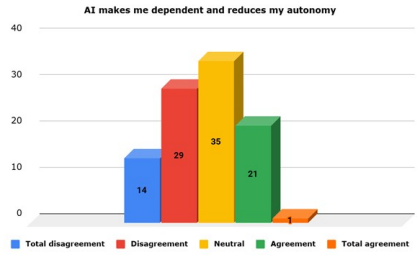

Figure no. 15. *The role of GenAI in reducing autonomy*

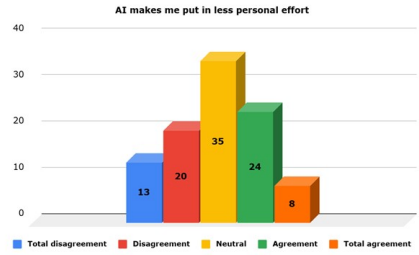

Figure no. 16. *The role of GenAI in reducing personal effort*

Overall, most respondents view GenAI tools as assets that have a positive influence on their academic lives and progress (see Figure no. 17).

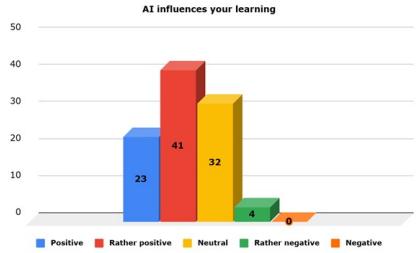

Figure no. 17. *Influence of GenAI tools*

To improve understanding, students completed an open-ended question inviting them to provide illustrative examples of how GenAI tools supported their learning. The categorisation of these questions was performed manually by the researcher. All the responses were reviewed, common themes were identified, and categories were formed based on recurring ideas. A total of 100 responses were received and divided into 6 different categories. Table no. 2 includes students' answers for each identified category to demonstrate the formation of each group.

Table no. 2. *Students' examples*

Categories/Themes	Students' answers
Exam preparation	Generated multiple-choice tests based on the course for exam preparation. Helped structure information and identify main ideas when time for preparation was limited. For exams, I send my courses and ask it to extract the essential ideas.
Course understanding and summarisation	It structured the lesson better by focusing on the main ideas. I understood the lesson better with AI's help. It helps me better understand difficult content.
Project work	I ask for activity ideas for my project.
Explaining concepts	I encountered terms I didn't understand, and AI provided the appropriate explanations. Explaining terms and lessons.
Interactive learning and practice	It asked me questions based on the courses to check my knowledge before the session. I asked it to apply a test from the lesson for me to solve, and it corrected and explained where I made mistakes.
Personalisation of learning	It structured the lesson better by focusing only on the main ideas, making it easier to understand. It helps me the most when I want to phrase something, giving me ideas and shortening my study time.

4.4. Accuracy of GenAI tools

GenAI tools have become increasingly used among students for various tasks. Understanding their accuracy is crucial, as it can directly influence the effectiveness and trustworthiness of the information they provide. According to 72% of respondents, their trust in GenAI as an academic source is only medium, with 16% rating it as a high source of information (see Figure no. 18).

The responses are not surprising, as 57% of students reported they have encountered incorrect responses generated by these tools (see Figure no. 19). The types of errors encountered by the respondents are illustrated in Figure no. 20. Most of them stated that they have come across misinterpretations, conceptual confusion and fabricated information.

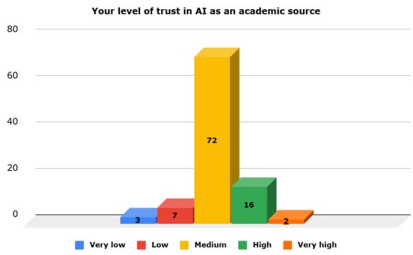

Figure no. 18. *Level of trust in GenAI tools*

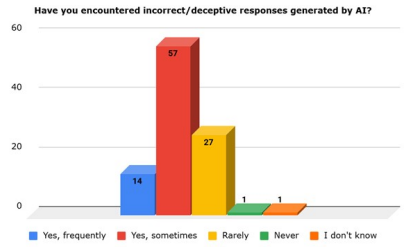

Figure no. 19. *Incorrect information encountered*

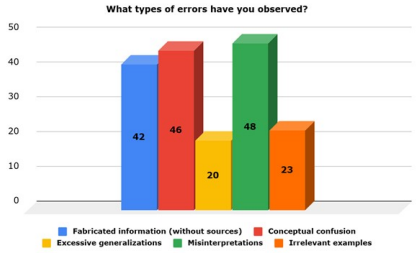

Figure no. 20. *Types of errors encountered by the students*

The same respondents reported that they mostly verify incorrect information on educational websites (73 respondents), in books (50 respondents), and in scientific articles (30 respondents). Of these, 25 respondents reported comparing their answers with multiple GenAI tools, whereas only 6 reported not verifying the information they received (see Figure no. 21). Most respondents (41%) sometimes verify information; others verify it often (28%) or always (20%), but unfortunately, some students rarely (10%) or never (1%) verify the correctness in other sources (see Figure no. 22).

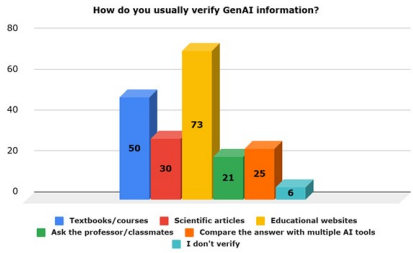

Figure no. 21. *GenAI generated information verification*

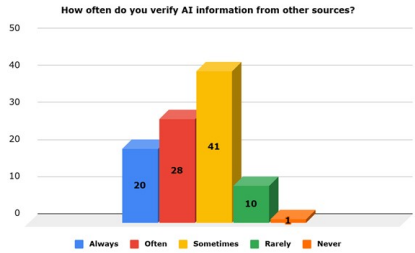

Figure no. 22. *GenAI generated information verification frequency*

4.5. Academic integrity and ethical issues

Regarding ethical issues and academic integrity, the majority (54%) of students who participated in this study understood what is permitted and prohibited when using GenAI tools, whereas only 25% of respondents partially understood the regulations (see Figure no. 23). Figure no. 24 highlights students' responses regarding the fields in which they consider the use of AI to be permitted.

Most students consider grammar correction and summarising to be generally accepted, while solving graded assignments and exam preparation elicited either unacceptable or neutral responses. When asked about lesson planning, most students offered neutral responses regarding the use of GenAI for this activity, whereas a significant portion considered it acceptable.

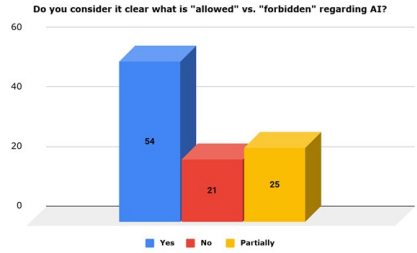

Figure no. 23. *GenAI allowed or forbidden*

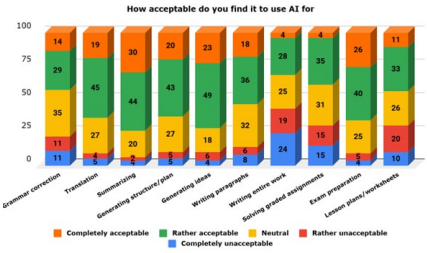

Figure no. 24. *GenAI use*

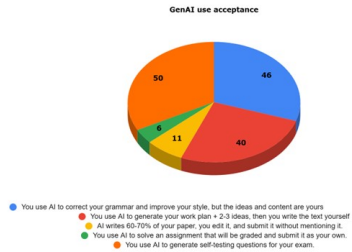

Figure no. 25. *GenAI use acceptance*

When asked whether the use of GenAI tools should be cited as a source, 43% of students believe it should be cited only in certain cases, while 28% consider it mandatory. 11% of the respondents do not consider it necessary to include these sources in their references, whereas 18% are unsure (see Figure no. 26). Of these, 59 respondents indicated that it is necessary to cite only the generated text; 35 stated that ideas and structures provided by GenAI tools should also be cited; and only 1 student indicated that all information generated by these tools should be recorded as a bibliographic source (see Figure no. 27). These findings are in contradiction with those presented in the literature and in academic integrity guidelines, which stress that all human- or AI-generated resources must be cited. This inconsistency is significant, as international guidelines and policies emphasise the importance of citing ideas and data to avoid plagiarism (American Psychological Association, 2020; Şchiopu-Constantin, 2021). One possible explanation for this finding is that students may not be fully aware of the implications of failing to cite data that is not their own. It also suggests an urgent need to help students understand academic integrity and ensure they follow proper citation practices.

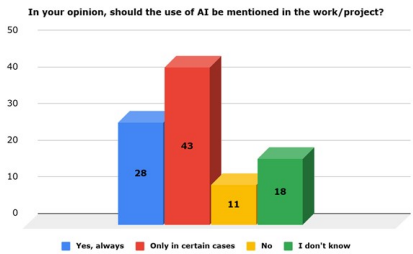

Figure no. 26. *GenAI information in References*

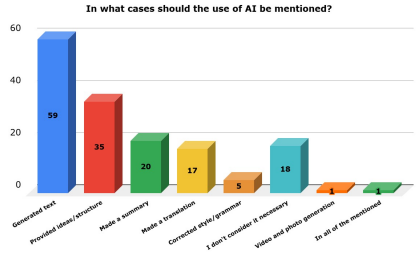

Figure no. 27. *GenAI information mentions*

With reference to the use of GenAI tools, most students (41% probably, 35% in agreement) who completed the questionnaire indicate that they would use these tools with greater confidence if the university provided them with official access and clear rules (see Figure no. 28). Among the measures that respondents consider should be implemented at the university, 70 students mentioned guides that clearly describe what is allowed and what is forbidden, 68 consider that training courses would be beneficial, while only 26 are in favour of data protection measures (see Figure no. 29).

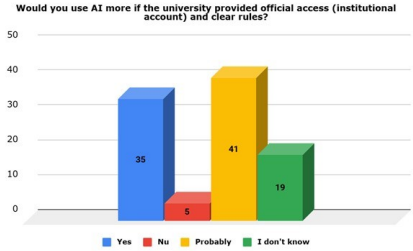

Figure no. 28. *Official access and clear rules*

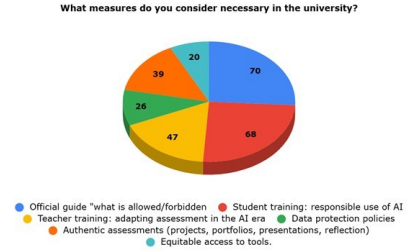

Figure no. 29. *Necessary measures*

4.6. Advantages and challenges of GenAI tool use

The last question included in the questionnaire was an open-ended one related to the advantages and challenges encountered by students when using GenAI tools. Table no. 3 encompasses the answers provided by the respondents. To gain better insight into the answers, they were included in the table under different categories.

Table no. 3. *Advantages and challenges of GenAI tool use*

Categories	Advantages
Personalised learning	The biggest benefit is personalised learning, as it explains lessons in a way each student understands. It helps students receive explanations, exercises, and feedback tailored to their pace and needs, increasing the likelihood of true understanding.
Time-saving	The biggest benefit is that I save time, and the biggest challenge is that it's not always correct. You learn everything much faster.
Access to information	The biggest benefit is rapid access to information. The biggest benefit is that we have much easier access to information.
Idea generation	It helps with idea generation. It generates answers very quickly, but if we searched for them ourselves, we would remember the information better.
Instant explanations	The biggest benefit is that you get instant explanations in a way you understand. It provides instant explanations, making it easier to learn and understand.
Rapid feedback	Feedback is fast and constant. It offers quick feedback and support.
	Challenges
Dependency on AI	The biggest challenge is dependency on AI, which may reduce critical thinking. The biggest challenge is using AI without having the necessary knowledge and presenting information at an event without verifying against other sources what is correct and what isn't.
Decline in critical thinking	The biggest challenge is that students might become dependent and stop thinking for themselves. It may affect critical thinking and creativity.
Loss of originality and creativity	The biggest challenge is the loss of originality and creativity, as students might copy everything and forget to add their personal input. The biggest challenge is the loss of creativity and originality when students overly rely on AI. AI can limit imagination and reduce creativity.
Overuse	AI is overused, which could diminish the need for personal input and effort.
Lack of accurate information	The biggest challenge is that it's not always correct. Many people use AI without verifying if what they've done with AI is correct. AI can give incorrect information, leading to misunderstandings.
Plagiarism and ethical use	AI might be considered as doing 90% of the work, which could raise ethical concerns It is important to use AI responsibly and avoid being reliant on it for completing assignments or presentations.

According to Table no. 3, there is a balance between the advantages and challenges of using GenAI. Personalised learning, time savings, access to information, and instant explanations are among the advantages identified by the students. The respondents stated that the greatest advantage of GenAI tools is their usefulness in explaining lessons in ways that everybody can

understand. Moreover, they are time-saving, and students can access information rapidly. Among the challenges, the students mentioned user dependence on AI tools, the decline in critical thinking, loss of originality and plagiarism.

Additionally, students provided a few suggestions on the proper use of GenAI tools. The answers are depicted in Table no. 4.

Table no. 4. *Suggestions on the correct use of GenAI tools*

Themes	Suggestions
AI as a learning tool	AI is very helpful when used as a tool for reviewing, idea generation, and summarising information.
	AI can be used as a starting point for brainstorming ideas, but students should add their own thoughts and creativity.
AI as a support	AI should be used as a tool to support learning, but not replace independent thought and effort.
	AI should be used as a helpful resource, not as a replacement for actual learning and effort.
AI and personal development	The challenge is using AI without becoming dependent on it, while still developing critical thinking and personal insights.
	Students need to ensure they use AI as a resource while still focusing on their personal learning and critical thinking.

As suggested by the respondents, students should use GenAI tools as learning aids that can help them summarise information and generate ideas. Students need to bring their own contribution and use these tools as support resources without becoming dependent on them.

4.7. Additional statistical analysis of GenAI use, perceived benefits, trust, and academic integrity

Beyond the descriptive distributions already reported, additional non-parametric analyses were performed to identify deeper associations between GenAI use, perceived learning effect, trust, verification behaviour, and academic integrity attitudes. Overall, respondents reported moderate-to-high engagement with GenAI tools. The median number of GenAI tools used was 2.0 (IQR: 1.0–3.0), while the median number of academic contexts in which GenAI was used was 3.0 (IQR: 2.0–4.0). The median number of task types supported by GenAI was also 3.0 (IQR: 2.0–4.0), indicating that

students do not use GenAI for a single isolated purpose, but rather across multiple learning and academic production activities.

ChatGPT or a similar chatbot remained the dominant tool, used by 92% of respondents. Canva or presentation-generating tools were used by 52%, while Google Gemini, Copilot, Claude, or similar tools were used by 28%. Regarding academic context, the most frequent were learning and understanding course content (72%), project or assignment work (68%), exam preparation (51%), presentation creation (47%), essay or paper writing (37%), and pedagogical practice or lesson plan preparation (28%).

Several significant correlations remained after false discovery rate correction. Digital competence was moderately associated with familiarity with AI tools (Spearman's $\rho = 0.513$, $p < 0.001$, $q < 0.001$), indicating that students who considered themselves digitally competent also tended to report a better understanding of GenAI functioning and limitations.

Reliance on AI was positively associated with trust in AI as an academic source ($\rho = 0.439$, $p < 0.001$, $q < 0.001$), perceived learning benefit ($\rho = 0.344$, $p < 0.001$, $q = 0.002$), and acceptability of high-risk uses such as full-text generation or solving graded tasks ($\rho = 0.332$, $p < 0.001$, $q = 0.002$). Frequency of GenAI use was also associated with reliance on AI ($\rho = 0.335$, $p < 0.001$, $q = 0.002$), but not with verification frequency ($\rho = 0.013$, $p = 0.900$). This suggests that students who use GenAI more often tend to rely on it more, but greater frequency of use does not necessarily imply more systematic verification of AI-generated information.

The benefit of the perceived learning was strongly associated with acceptability of supportive uses of GenAI, such as summarizing, generating ideas, structuring work, grammar correction, translation, or exam self-testing ($\rho = 0.480$, $p < 0.001$, $q < 0.001$). It was also associated with a greater willingness to use AI if the university provided official access and clear rules ($\rho = 0.368$, $p < 0.001$, $q = 0.001$). This finding suggests that students who perceive greater educational value in GenAI are also more receptive to institutional regulation and support.

A noteworthy negative association was observed between exposure to incorrect or misleading AI-generated answers and trust in AI as an academic source ($\rho = -0.343$, $p < 0.001$, $q = 0.002$). However, exposure to errors was not significantly associated with more frequent verification of AI-generated information ($\rho = 0.106$, $p = 0.298$). This suggests that encountering incorrect AI output reduces trust but does not automatically translate into more rigorous checking behavior.

Communication of rules by the university or professors was moderately associated with students' perceived clarity regarding what is permitted or forbidden when using AI ($\rho = 0.434$, $p < 0.001$, $q < 0.001$). However, perceived ethical clarity was not associated with lower acceptability of high-risk AI use ($\rho = 0.010$, $p = 0.924$). This indicates that simply knowing whether AI use is permitted or forbidden may not be sufficient to reduce ethically problematic attitudes; practical training and redesign of assessments may also be needed.

Table no. 5. Main statistically significant correlations

Association	Spearman's rho	p-value	FDR-adjusted q-value
Digital competence – AI familiarity	0.513	<0.001	<0.001
Learning-benefit score – supportive-use acceptability	0.480	<0.001	<0.001
Reliance on AI – trust in AI	0.439	<0.001	<0.001
Rules communicated – ethical clarity	0.434	<0.001	<0.001
Learning-benefit score – willingness to use official AI access	0.368	<0.001	0.001
Reliance on AI-learning-benefit score	0.344	<0.001	0.002
Error exposure-trust in AI	−0.343	<0.001	0.002
Frequency of use-reliance on AI	0.335	<0.001	0.002
Reliance on AI-high-risk-use acceptability	0.332	<0.001	0.002
Learning-benefit score-dependency/reduced-effort score	0.330	<0.001	0.002

4.7.1. *Internal consistency and composite scores*

The items assessing perceived learning benefits showed excellent internal consistency. The eight-item learning-benefit score had a Cronbach's alpha of $\alpha = 0.949$, with a mean score of 3.42 ± 0.96 and a median of 3.56 (IQR: 3.00–4.00). Exploratory principal component analysis supported a single

dominant dimension, with the first component explaining 74.1% of the variance and all item loadings above 0.81. This supports the interpretation that students' responses to the learning effect items reflected a coherent underlying construct.

The strongest perceived benefits were instrumental: saving time, understanding difficult content, receiving explanations adapted to one's level, organizing ideas, and learning more actively. The five-item instrumental-benefit score had a Cronbach's alpha of $\alpha = 0.945$, a mean of 3.66 ± 0.99, and a median of 3.80 (IQR: 3.20–4.20). By contrast, the affective-benefit score, based on motivation and reduced stress/anxiety, was lower, with a mean of 2.95 ± 1.10 and a median of 3.00 (IQR: 2.38–3.50). This suggests that students perceive GenAI primarily as a practical cognitive and organizational support tool rather than as a strong emotional or motivational aid.

The two-item perceived dependency/reduced-effort score had good internal consistency (Cronbach's alpha $\alpha = 0.829$), with a mean of 2.80 ± 0.99 and a median of 3.00 (IQR: 2.00–3.50). This indicates that, at the group level, students were ambivalent rather than strongly convinced that GenAI reduces autonomy or personal effort.

4.7.2. *Differences by study year and residence*

No statistically significant differences across study years were found in the frequency of GenAI use, reliance on AI, perceived learning benefit, trust in AI, verification frequency, supportive-use acceptability, or ethical clarity. The only significant difference by study year concerned willingness to use GenAI more if the university provided official access and clear rules: $H(2) = 10.744$, $p = 0.0046$, $\varepsilon^2 = 0.090$. This willingness was highest among second-year students, with a median of 4.5 compared with 4.0 in first- and third-year students.

Residence was not significantly associated with frequency of GenAI use, reliance on AI, perceived learning benefit, trust, verification frequency, ethical clarity, or willingness to use official AI access. A weak unadjusted difference was observed for digital competence, with urban students reporting a higher median score than rural students (median 4.0 vs. 3.0; $H = 5.872$, $p = 0.015$,

$\varepsilon^2 = 0.050$), but this should be interpreted cautiously due to multiple testing. An exploratory categorical analysis suggested that use of Gemini/Copilot/ Claude-type tools differed by study year, increasing from 16.3% in first-year students to 29.4% in second-year students and 47.8% in third-year students; $\chi^2 = 7.448$, $p = 0.024$, Cramér's $V = 0.273$. This indicates a possible tendency for more advanced students to diversify beyond ChatGPT, although the result should be considered exploratory.

4.7.3. *Academic integrity and acceptability of AI use*

The acceptability analysis showed a clear distinction between supportive and high-risk uses of GenAI. Supportive-use acceptability had a mean score of 3.60 ± 0.80 and a median of 3.75 (IQR: 3.22–4.00), with good internal consistency (Cronbach's alpha $\alpha = 0.894$). The highest acceptability was reported for summarizing materials (74% acceptable or completely acceptable), idea generation (72%), exam self-testing (66%), translation (64%), and generating a structure or plan (63%).

By contrast, high-risk-use acceptability, based on full-paper writing and solving graded assignments, was lower, with a mean of 2.84 ± 1.09 and a median of 3.00 (IQR: 2.00–4.00). Full generation of an entire paper was accepted by 32% of respondents, while 43% considered it unacceptable or completely unacceptable. For solving graded assignments or exercises, responses were more divided: 39% considered them acceptable or completely acceptable, 31% were neutral, and 30% considered them unacceptable or completely unacceptable. This distribution shows that students are not uniformly opposed to higher-risk academic uses of GenAI and that academic integrity guidance should explicitly address these borderline or ambiguous practices.

Principal component analysis of the ten acceptability items suggested a two-dimensional pattern. The first component reflected general openness toward GenAI use and explained 54.0% of the variance. The second component, explaining 16.3% of the variance, contrasted low-risk supportive uses, such as grammar correction, translation, summarizing, and exam self-testing, with higher-risk uses, such as full-paper writing, solving graded tasks, and lesson

plan generation. This supports the interpretation that students distinguish between AI as a learning assistant and AI as a substitute for personal academic work, but that this distinction is not yet sufficiently clear for all respondents.

5. Limitations of the study

While the study offers valuable insights into the use of GenAI tools by students in the Primary and Preschool Education Pedagogy study program, it also has several limitations that should be considered. One considerable limitation of the present study is the near-exclusively female sample, with 99% of respondents being female (1% is male). This gender bias limits the generalisability of the findings, as perceptions of male students may differ. Generalisability could also be limited by the fact that the respondents belong to a single institution. A second limitation is that, although the present study includes exploratory, inferential, and correlational analyses, its cross-sectional design does not permit causal inferences. The findings should therefore be interpreted as associations between students' self-reported GenAI use, perceptions, trust, and academic-integrity attitudes. A third limitation could be the cross-sectional design of the research, which does not allow the researcher to track changes over time. Future studies should include a more balanced sample to ensure more representative results for a wider population.

6. Conclusions

The use of GenAI tools is becoming increasingly widespread, and it is important for students to understand the limitations to consider when using technology. It is important for students to understand that GenAI tools can support their learning to some extent, but overuse may hinder the development of their critical thinking skills and negatively affect learning outcomes.

Students from the Pedagogy of Primary and Preschool Education study program, years I, II, and III, at George Emil Palade University of Medicine, Pharmacy, Science and Technology of Târgu Mureş, admitted using GenAI

tools, but they also mentioned that they understand what is limited and permitted while using advanced technology for academic purposes.

Higher education students use GenAI tools regularly. In response to RQ1, 45% of respondents reported using GenAI tools for academic purposes, particularly ChatGPT, a finding consistent with other studies (Baek et al., 2024). DeepL, a translation program, is the least-used because it is dedicated solely to translation. For RQ2, students reported using GenAI tools for learning, creating projects, preparing for exams and creating lesson plans and presentations. This finding aligns with Sousa and Cardoso's (2025) argument that students use GenAI tools to summarise a text, analyse data and write their essays.

Moreover, RQ3 revealed that students' reliance on GenAI tools is moderate, and they are regarded as resources that can help them save valuable time while learning for different subjects. While studies (Baek et al., 2024; Vieriu & Petrea, 2025) have suggested that the use of AI-driven tools diminishes students' critical thinking skills, the results of this research indicated that higher education students use these tools to clarify terminology, refine explanations, structure their work and support critical thinking.

Most of the students who took part in the study believe that GenAI tools do not create dependency. Instead, they consider them assets that contribute positively to their academic development. However, further investigations are needed to better understand respondents' perceptions of dependency and how these may influence students' engagement with such tools. Even though students perceive GenAI tools as useful and important, respondents' trust in them is only moderate because they sometimes generate incorrect responses. Furthermore, responses to RQ4 indicated that the same respondents believe not all information generated by AI-driven technology should be cited, whereas 35 respondents believe that ideas and structures generated are also necessary to be cited in the references. Students also provided suggestions for consideration when using GenAI, which can be viewed as advice for future users.

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