On application of generative artificial intelligence in higher education: insights from bulgarian students

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Abstract: *The rapid integration of generative artificial intelligence (Generative AI) tools into higher education has significantly influenced student learning behaviour and academic practices. This research paper explores the ways in which undergraduate students at Sofia University "St. Kliment Ohridski" apply these technologies for both academic and non-academic purposes. The results reveal that students predominantly use Generative AI for academic support, such as explaining complex concepts, conducting research, and assisting in writing tasks. At the same time, they also engage with Generative AI for personal productivity, communication, and creative exploration. Despite having generally positive perceptions of academic effectiveness, students show critical awareness of risks related to information accuracy, privacy, and ethical use.*
KEYWORDS*: GENERATIVE AI, HIGHER EDUCATION, STUDENTS, BULGARIA, AI IN LEARNING, EDUCATIONAL TECHNOLOGY, CHATGPT*

1. Introduction

The introduction of powerful generative AI tools since 2022 has rapidly transformed student behavior in higher education worldwide. University students began experimenting with AI for a range of academic and personal tasks. Surveys and studies from 2023 and 2024 indicate that a majority of college students have now used AI in their studies, often viewing it as a useful aid despite ongoing debates about academic integrity [1]. Researchers have characterized the rapid spread of artificial intelligence utilization among students as a phenomenon with both potentially beneficial and damaging implications: it offers new learning opportunities but also raises concerns about plagiarism, skill development, and equity [2], Early evidence suggests students are largely positive about the technology's potential to assist their education [3], yet they remain cautious about its limitations and the propriety of using AI in graded work [4]. This paper reviews the (1) academic applications of generative AI by students, (2) non-academic uses for personal or creative purposes, and (3) the benefits, as well as risks and ethical concerns, identified in recent research documents. The paper present results from a survey entitled "Use of Generative AI Tools for Education and Other Purposes" conducted among undergraduate students from Sofia University "St. Kliment Ohridski", Faculty of Economics and Business Administration.

2. The Research Backgrounds

University and college students have eagerly adopted generative AI as a study aid and productivity tool for a variety of academic tasks. Research consistently shows that the cases of academic-related use are the primary way students leverage AI, often more than for personal or entertainment purposes [5], Common academic applications of generative AI include:

Writing assistance and content generation. The most widespread use is as a writing support for assignments and essays. Students use AI chatbots to brainstorm ideas, generate initial drafts, refine their phrasing, and check grammar. In a global 2024 survey, 66% of students reported using ChatGPT or similar tools for writing tasks, including creating first drafts (24% of respondents) and paraphrasing text (28%) [1]. Qualitative studies have found that students primarily use AI to improve the clarity and expression of their own ideas rather than to write entire essays for them [6]. Consistently, only a negligible proportion (approximately 5%) of students acknowledge submitting AI-generated content without significant modification, suggesting that the predominant utilization pattern is as an additional academic resource rather than as a full replacement for original authorship [7].

Study and learning support. Study Aids and Learning Support: Generative AI applications have evolved into essential academic companions for a significant portion of the student population. Tools like ChatGPT are used to explain difficult concepts, summarize readings, and provide tutoring on demand [8]. More than one-third of students in multiple surveys report using AI as a personal tutor – asking it to rephrase confusing course material, provide examples, or test their knowledge with practice questions. For example, 36% of UK undergraduates surveyed in 2023 said they use AI to help explain concepts for assessments (acting as an AI tutor) [7]. Similarly, 34% of daily AI-using students in the U.S. use generative AI to summarize or paraphrase academic texts and lecture notes for better understanding [8]. Clarification and review capabilities are seen by students as a major advantage of AI, allowing more self-directed learning and revision outside of formal classes [9].

Preparing homework and answering research questions. Many students turn to AI chatbots as an alternative search engine or Q&A resource when they face difficulties with homework. In the global 2024 survey, the single most common usage was searching for information (69% of students) through AI [1]. In research-heavy assignments, students also use AI to gather background information or identify relevant literature. However, they have noted that chatbots sometimes produce legitimate-like but incorrect answers or fake citations, requiring verification [4].

Coding and technical assistance. Generative AI coding assistants (like GitHub's Copilot or GPT-4) are becoming increasingly popular among students in STEM fields. STEM students have embraced AI to help write code, debug errors, and generate algorithms for programming assignments [10]. University surveys indicate that while these tools are used less commonly than writing assistance, a notable subset of students (particularly in computer science/engineering) regularly consult AI for coding help [4].

Presentations and other academic tasks: Beyond text and code, students use generative AI to support various other educational activities. This includes creating presentation content (e.g. generating slides or talking points), data analysis assistance (using AI to interpret data or perform calculations), and even language translation for academic materials [8]. AI image generators are occasionally used to produce illustrations or figures for assignments and design projects though text-based applications dominate [7].

Beyond formal academic tasks, students are also exploring generative AI for a range of non-educational, personal, and creative purposes. While cases of academic use dominate overall, surveys show that a significant fraction of students have engaged with AI tools for everyday tasks, creative projects, or just for fun [4]. Common non-academic usage of generative AI among students include:

Personal productivity and organization: Many students use AI as a personal assistant to perform daily tasks. For example, AI tools help with scheduling, reminders, and task management. Another common use is drafting routine communications – for

example, using AI to draft an email or message which the student can then refine [8].

Career development: Generative AI has become a valuable tool for students preparing to enter the job market. Career centers report students using AI to write or polish resumes, cover letters, and internship applications. In a recent study, about 31% of daily student AI users leveraged it for resume/cover letter writing [8].

Language translation and communication support: multilingual students and non-native English speakers utilize AI for translation and language practice. Advanced AI translators can convert text between languages with high accuracy, which assists international students in both academic work and everyday communication. For example, students might write an email or essay in their first language and use AI to translate it into English (or vice versa) as a starting point. The Higher Education Policy Institutes' survey found that 38% of students expect to use AI after graduation for translating text in their jobs [7].

Personal advice and emotional support: a very interesting and controversial aspect of students' AI usage is for advice, coaching, or emotional support. Some of them treat AI chatbots as a nonjudgmental listener or life coach, asking for mental health tips, study motivation, or relationship advice. While AI is not a substitute for professional counseling, students seem to appreciate the privacy and availability of AI for personal advice or even stress relief [4].

In summary, generative AI has impacted students' daily routines in various ways. Academic usage remains predominant, but many students also experiment with AI for personal productivity, creativity, social connection, and career preparation.

While writing assistants offer substantial benefits for improving students' written work by pointing out errors, suggesting rephrasing, improving coherence etc., and helping them produce higher quality papers, at the same time an important concern is that generative AI enables forms of plagiarism or cheating by allowing students to produce work that is not their own. Both students and faculty are concerned about the ease of having AI write papers or solve exam questions. Surveys confirm that a large majority of students consider certain uses of AI to be unethical – for instance, 62% of students in Sweden said that using a chatbot during an exam is cheating [5], and 70% of UK students were opposed to peers using ChatGPT to write an entire essay for them [4].

It is proven that Generative AI assistants tend to produce incorrect or even fake information with a confident tone, a phenomenon known as hallucination. This poses a serious risk for students who are not aware of this threat. A survey shows that 35% of students who use AI did not know how often these tools emit incorrect information [7].

Another aspect of concern is revealed by a recent survey of Harvard undergraduates about AI's impact on career prospects across all fields. Approximately 55% of students report that generative AI has changed how they think about their future careers, while around 45% worry AI will negatively affect their career plans. This concern remains consistent across diverse career paths, including technology, research, finance, public health, politics, education, and consulting, with all fields showing similar levels of concern (approximately 45%) [11].

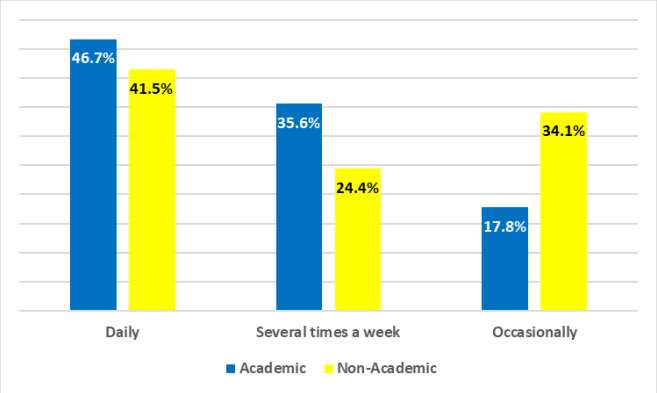
3. Data and Methodology

The survey entitled "Use of Generative AI Tools for Education and Other Purposes" was implemented online in April 2025 among undergraduate students from bachelor programs at the Faculty of Economics and Business Administration, Sofia University "St. Kliment Ohridski". The survey was designed using Microsoft Forms in the internal Microsoft 365 tenant of the faculty and consisted of 12 closed-ended questions, 8 single choice and 4 multiple choice ones. The survey aimed to unveil how students use Generative AI for both academic and non-academic purposes, as well to identify students' perceptions on the impact on their future careers. The survey was sent to 364 respondents through the internal messaging system of Sofia University, all part of the English language programs. The survey was sent on April 16th and closed on April 23rd, 2025. Out of the 364 distributed questionnaires, 45 valid responses were received (n=45), resulting in a response rate of approximately 12.4%. The survey has 2 separate parts: use of Generative AI tools for academic and use of Generative AI tools for non-academic purposes. Students who reported not using Generative AI tools for non-academic purposes (4) did not participate in this part of the survey. No incentives were offered and participation was entirely voluntary and anonymous.

4. Results and Discussion

All respondents are active users of Generative AI tools. Chart 1 illustrates the comparative frequency of Generative AI tool usage across academic and non-academic contexts. Three usage categories were analyzed: daily, several times a week, and occasional use.

Chart 1. *How often do you use Generative AI tools for academic purposes? / Beyond academics, how often do you use generative AI in your daily life?*



The data reveals that daily usage is the most common pattern in both contexts, though slightly more is reported for academic purposes. Specifically, 46.7% of respondents reported using Generative AI tools daily for academic activities, compared to 41.5% for non-academic tasks. This suggests that for a significant proportion of users, AI tools have become integrated into their routine academic workflows. The second most frequent usage pattern is "several times a week." Again, academic use remains dominant, with 35.6% of students using Generative AI regularly throughout the week for their studies. In contrast, only 24.4% reported using AI with the same frequency for non-academic purposes. This highlights a more structured and consistent reliance on AI for education compared to a more flexible and situational use in their personal life. The most noticeable difference appears in the "occasionally" category. Here, non-academic use significantly outpaces academic use: 34.1% of respondents use Generative AI tools occasionally for personal reasons, while only 17.8% do so for academic work. This suggests that while AI is often a core tool for academic success, its use in non-academic domains may still be exploratory or opportunistic.

Table 1 represents the results, showing different academic tasks supported by Generative AI tools and measured by a multiple choice question.

Table 1. *For which of the following academic tasks do you use Generative AI tools?*

Explaining difficult concepts	**84.4%**
Research Assistance	**75.6%**
Brainstorming ideas	**71.1%**
Generating ideas for projects	**57.8%**
Solving math or coding problems	**55.6%**
Writing and editing papers	**48.9%**
Other	**6.7%**

The most frequently reported use of Generative AI is for explaining difficult concepts, as selected by 84.4% of participants. This indicates that students view AI tools as effective digital tutors, helping them to clarify complex theories, ideas, or course materials. Research assistance was the second most cited use, with 75.6% of students leveraging AI to support activities, such as sourcing information, formulating research questions, or structuring literature reviews. This reflects a shift in research behaviors toward AI-extended knowledge discovery. Brainstorming ideas was selected by 71.1% of respondents, emphasizing the value of AI in the early, creative stages of academic work. Similarly, 57.8% of students used AI tools to generate ideas for projects, showing that Generative AI is a key support mechanism in ideation and project planning. More than half of the students (55.6%) reported using AI to solve math or coding problems, highlighting its growing role in STEM-related disciplines. This demonstrates a broadening of AI application from writing support to quantitative and technical problem-solving. Writing and editing papers was mentioned by 48.9% of participants. While slightly lower than the other categories, this still indicates a substantial reliance on AI for drafting, revising, or polishing academic texts. Lastly, 6.7% of respondents indicated "other" uses, not listed in the main categories, but did not provide an answer.

Table 2 shows the results of the answers to the question about the effectiveness of Generative AI tools in the academic context.

Table 2. *How effective do you find generative AI tools in improving your academic performance?*

Very effective	**42.2%**
Somewhat effective	**55.6%**
Neither effective nor ineffective	**2.2%**
Somewhat ineffective	**0.0%**
Very ineffective	**0.0%**

The majority of survey respondents expressed a positive perception of the impact of Generative AI tools on their academic performance. Specifically, 55.6% of participants rated the tools as "Somewhat effective", indicating a moderate but meaningful contribution to their academic outcomes. An additional 42.2% considered them "Very effective", reflecting a high level of satisfaction. Combined, these two categories represent 97.8% of the sample, demonstrating an overwhelming approval of Generative AI's role in education. Only 2.2% of respondents selected "Neither effective nor ineffective", suggesting neutrality or uncertainty. Importantly, none of the respondents found the tools "Somewhat ineffective" or "Very ineffective", underscoring that negative experiences with AI in academic contexts were either minimal or non-existent among the surveyed group.

Table 3 presents the data from a multiple-choice question related to the most common tasks performed by the students in non-academic domain, with the support of Generative AI tools.

Table 3. *What do you most commonly use Generative AI for in your personal life?*

Getting information or explanations (instead of using search engines)	**75.6%**
Personal problem-solving	**43.9%**
Writing emails, messages, or posts	**39.0%**
Health/wellness information	**36.6%**
Learning new skills	**34.1%**
Generating ideas or content (art, music, stories)	**24.4%**
Making decisions (e.g., shopping, planning)	**24.4%**
News summarization	**24.4%**
Entertainment	**22.0%**
Other	**2.4%**

The most common non-academic use, as reported by 75.6% of respondents, is getting information or explanations instead of using traditional search engines. This suggests that Generative AI is increasingly perceived as a faster or more intuitive alternative to search engine platforms for answering everyday questions. Personal problem-solving was the second most common use, as selected by 43.9% of participants. This includes tasks such as organizing schedules, managing life challenges, or receiving advice etc., showing that students see value in AI as a practical support system. Following closely are writing emails, messages, or social media posts, (39%) and seeking health and wellness information (36.6%). These uses reflect how AI tools are embedded in daily digital communication and personal care routines. About a third of respondents (34.1%) use AI tools to learn new skills, highlighting their role in informal education and self-improvement. A smaller group of respondents (24.4% each) reported using AI for generating creative content, making decisions (e.g., shopping, planning), and news summarization. This demonstrates AI's multifunctionality in multiple daily tasks. "Entertainment" was cited by 22% of respondents, while only 2.4% selected "Other," indicating that most use cases fall within the categories presented.

Table 4 presents data on students' concerns related to the use of Generative AI tools based on a multiple-choice question.

Table 4. *Do you have any concerns about using generative AI tools?*

Accuracy of information	**78.0%**
Dependency on technology	**56.1%**
Privacy issues	**39.0%**
Ethical implications	**29.3%**
Other	**9.8%**
I don't have any concerns	**7.3%**

The most frequently reported issue, as selected by 78.0% of respondents, is accuracy of information. This finding suggests that users are critically aware that AI-generated content may be factually incorrect, misleading, or lacking credibility. The second most reported concern, as identified by 56.1% of students, is dependency on technology. This highlight concerns overreliance on AI for tasks that traditionally require independent thinking or manual effort, possibly affecting cognitive development, creativity, even academic integrity. Privacy issues were flagged by 39.0% of respondents. This includes fears about data collection, surveillance, or misuse of personal information provided to AI platforms. Additionally, 29.3% of participants expressed concern about the ethical implications of AI use. These may include fairness, bias in AI outputs, the origin of training data, or potential social impacts such as job displacement or manipulation of information. A small group (9.8%) selected "Other", suggesting concerns that fall outside standard categories and are related to ecological impact. Only 7.3% of respondents reported that they did not have any concerns about Generative AI use. The overall results indicate that the majority of respondents (over 90%) approach these tools with some level of caution or critical awareness.

Chart 2 presents students' perceptions of how Generative AI tools will impact their future careers.

The majority of respondents (53.7%) believe Generative AI will have a positive impact on their future careers. This reflects a strong sense of optimism and confidence in the potential of AI to enhance employability, productivity, and relevance in a rapidly evolving job market. A significant portion, 34.1%, are not sure about the impact. This uncertainty may come from a lack of clear understanding about AI's future role in different industries, or the evolving expectations of employers. A smaller group, 12.2%, expects a negative impact. These concerns may relate to fears of jobs automation, skill-based lay-offs, or an over-dependence on technology in the jobs domain. Interestingly, 0% of respondents selected "No impact", suggesting that all participants anticipate some degree of influence from Generative AI on their career.

Chart 2. *How often do you use Generative AI tools for academic purposes? / Beyond academics, how often do you use generative AI in your daily life?*

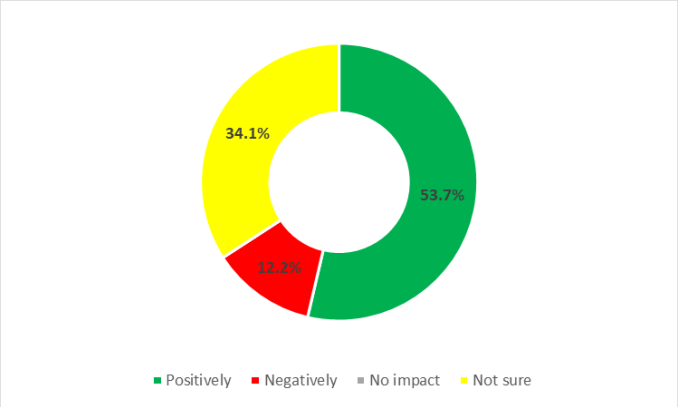
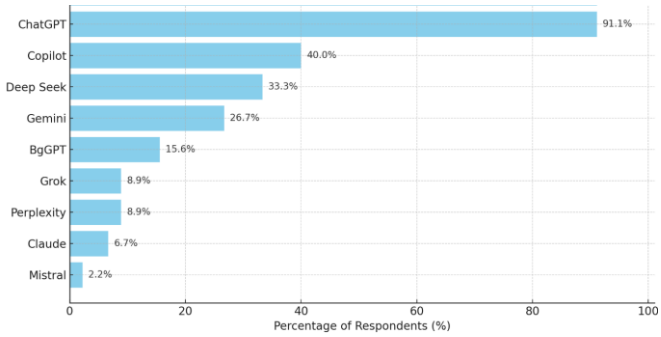


Chart 3 illustrates the results of the most popular Generative AI agents used by surveyed students and are based on a multiple choice question.

Chart 3. *Which Generative AI tools do you use?*



ChatGPT is the most popular tool (91.1% of respondents), followed by Copilot (40%), Deep Seek (33.3%), and Gemini (26.7%). Other tools like Perplexity, Claude, and Mistral are used far less frequently. The Bulgarian language model - BgGPT is used by 15.6%, which is more than other globally known tools and it is an indication of a preference for the national Generative AI solution. An interesting trend is outlined on a secondary level of data analysis: students were able to provide more than one answer, so the ones who reported usage of 4 and more tools represent 19.5%, 3 tools - 26.8%, 2 tools - 29.3% and a single tool - 24.4% (and it is only ChatGPT), which is an additional evidence of the identified concern about information accuracy, forcing students to perform cross-checking with different tools.

Despite high levels of usage and the variety of tools, only one-third (34.1)% of participants had received any structured instruction or guidance on how to use Generative AI tools effectively. The remaining 65.9% learned to use these tools independently, highlighting a gap in formal digital literacy education. As the Faculty of Economics and Business Administration do not provide formal training on Generative AI technics, students most probably define different online courses on the market as formal training. There is no significant difference in the answers based on gender distribution, respondents included both male and female participants, with a balanced representation: 60% female, 40% male.

5. Conclusions

Generative artificial intelligence has become an integral part of students' academic and personal lives. They perceive Generative AI as both beneficial and transformative in improving academic performance and enhancing career readiness. At the same time, they raise important concerns regarding the reliability of AI-generated content, overreliance on technology, and ethical implications of usage, especially in assessment settings. The overview of worldwide reports and research papers, compared with the local research, does not show any significant differences among students in the way they use, evaluate, and perceive generative AI tools, both in the academic and non-academic domain. The results clearly indicate that higher education institutions must proactively incorporate Generative AI literacy into their curricula. Structured guidance, training sessions, and ethical frameworks can help students use AI technologies in a more informed and appropriate manner. As generative AI continues to evolve, educational systems must adapt to ensure that these tools enhance learning without compromising academic integrity or critical thinking development.

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