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How college students use ChatGPT

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ABSTRACT

As Artificial Intelligence (AI) tools like ChatGPT become more accessible, it is increasingly important for educators to understand how students use these technologies. Despite the growing presence of AI in higher education, there is limited research examining how students report using these tools in both academic and personal contexts. This study investigates student engagement with AI, focusing on usage patterns, academic applications, and student perceptions. Of the 1265 University of Guelph students surveyed, 86.4% reported using AI tools. Students primarily used AI for academic support, including explaining concepts, solving homework problems, and clarifying assignment expectations. Many students, however, reported avoiding AI due to concerns about academic integrity. Only 29 students indicated facing consequences for using AI in contexts where it was either prohibited or not clearly permitted. Beyond coursework, students also used AI for general research, skill development, and non-academic writing tasks. Overall, perceptions of AI's impact on learning were mixed, with nearly equal proportions of students reporting positive and negative effects.

Keywords: GenAI, GPT, ChatGPT, python, university

INTRODUCTION

In an era of accelerating technological change, generative artificial intelligence (GenAI) is poised to redefine the landscape of higher education. For today's students, tools like ChatGPT are no longer futuristic novelties; they are becoming integrated into everyday academic life, assisting with tasks ranging from brainstorming and summarizing to research support and writing (Cotton et al., 2023). These technologies have gained widespread attention not only for their ability to produce text, images, and audio, but also for their potential to personalize learning, streamline academic tasks, and increase access to knowledge (Feuerriegel et al., 2024; Kelleher, 2019; OpenAI et al., 2023). As universities explore new pedagogical strategies, GenAI stands out as a powerful force that is reshaping how students engage with academic content.

The integration of GenAI tools into the academic environment offers several promising opportunities. These include their use as personalized tutors, research assistants, or tools for generating and revising academic writing (Baidoo-Anu & Ansah, 2023). Additionally, researchers have highlighted the potential for GenAI to improve efficiency in grading, feedback delivery, and content generation for instructors (Cotton et al., 2023; Terwiesch, 2023). Given their accessibility and adaptability, tools like ChatGPT may help reduce barriers to academic success by providing students with personalized, real-time support.

Despite these opportunities, GenAI technologies also raise important ethical, practical, and pedagogical concerns. Concerns about academic integrity, the reliability of AI-generated content, and the potential erosion of human interaction have become central to discussions about the role of GenAI in education (Baidoo-Anu & Ansah, 2023; Ipek et al., 2023; Lim et al., 2023). Many students and educators worry that AI use may constitute a form of academic dishonesty or undermine the development of critical thinking and writing skills (Ipek et al., 2023). Surveys indicate growing concern about the potential for cheating and misuse, as well as widespread confusion about acceptable use in academic settings (Abdullahi et al., 2024; AIinHE, 2024; Johnston et al., 2024). At the same time, the demand for digital literacy and AI-related skills in the workforce continues to grow, making blanket bans on these technologies both impractical and potentially harmful to student preparation for future careers (Johnston et al., 2024).

While much of the existing literature explores the capabilities and implications of GenAI tools, there remains a notable gap in understanding how students themselves are engaging with these technologies. Although studies by Abdullahi et al. (2024), Chan and Hu (2023), and Johnston et al. (2024) have begun to investigate student attitudes, usage patterns, and perceptions, few have provided a comprehensive or large-scale examination of these experiences within a broad range of university contexts.

This study aims to bridge an important gap by examining college students' familiarity with usage patterns of, and attitudes toward generative AI tools, with a specific focus on ChatGPT, the most widely used GenAI tool among students (Abdullahi et al.,

2024; Johnston et al., 2024). By analyzing survey data, this research offers timely insights into the student experience, thereby informing institutional policies and pedagogical strategies. Ultimately, the findings contribute to a deeper understanding of how GenAI is reshaping the academic landscape and support a more informed, equitable approach to integrating AI in higher education.

LITERATURE REVIEW

What is ChatGPT?

ChatGPT is an AI tool developed by OpenAI that can interpret and generate human-like text, allowing it to carry on conversations, answer questions, and perform various language-based tasks. It has become the most widely used GenAI tool, praised for its fluent, natural language generation (Krause et al., 2025). Founded in 2015, OpenAI is a nonprofit organization with goals to develop algorithms and techniques that endow computers with an understanding of our world (Karpathy et al., 2016). OpenAI's most advanced system is GPT-4, capable of taking image and text inputs and producing text outputs.

GPT-4 is the natural language processing (NLP) model underlying ChatGPT, enabling it to generate human-like text. NLP tasks refer to processes such as text summarization, translations, question answering and even speech recognition (Brown et al., 2020). GPT-4 was developed to improve on previous models' abilities to understand and generate natural language text (OpenAI et al., 2023). Trained on a diverse range of texts, including books, articles and websites, ChatGPT has the ability for coherent conversation and responses on a wide range of topics (Roumeliotis & Tselikas, 2023). ChatGPT has shown the ability to translate languages, generate summaries of large documents, and respond to natural language prompts from users (Cotton et al., 2023).

Despite its impressive advancements, GPT-4, like earlier versions, still faces significant limitations. These include problems like hallucination of facts; errors in reasoning; and inability to update information beyond the model's training cutoff date, as discussed in the study by (OpenAI et al., 2023). According to OpenAI et al. (2023), AI hallucinations occur when "the output generated by the model deviates from the truth, either by fabricating facts or presenting misleading information." Its wide range of knowledge combined with its conversational ability has led to the widespread adoption of ChatGPT in various fields including but not limited to higher education (Baidoo-Anu & Anash, 2023), business (Terwiesch, 2023) and medical (Pinaya et al., 2023). The capabilities of ChatGPT demonstrate the broader promise of GenAI tools in enhancing education. These technologies offer opportunities to personalize learning, support instructors, and create more efficient learning environments.

Opportunities of Generative AI in Higher Education

Since its introduction, the use of Generative AI in education has sparked immense excitement and intense debate, reshaping contemporary understandings about teaching and learning. GenAI can greatly enhance the learning experience, offering personalized support and assisting with academic tasks (Su & Yang, 2023).

One of the primary opportunities presented by GenAI is its ability to serve as a personalized learning tool. Baidoo-Anu and Ansah (2023) highlight how students can use ChatGPT as a virtual tutor, asking questions and receiving explanations outside of the classroom, resulting in improved learning outcomes. This form of immediate, personalized learning support aligns with the findings of Chan and Hu (2023), whose survey of undergraduate and postgraduate students revealed that one of the greatest benefits of GenAI is its capacity to provide personalized, on-demand learning assistance.

Purdue University has integrated its own AI tools into its writing assistance program, allowing students to receive real-time feedback on their drafts. The tool enables students to upload a draft along with the assignment rubric and provides instant feedback on how well their work aligns with the criteria. This program has been closely monitored to ensure that it complements rather than replaces students' academic skills (Purdue University, 2023). Similarly, Georgia Tech has developed an AI teaching assistant, Jill Watson, which helps students by answering routine questions in online courses (Taneja et al., 2024). This AI system, designed using IBM's Watson technology, was able to provide accurate responses to student inquiries and manage thousands of questions each semester. The success of Jill Watson led to the creation of additional AI assistants, demonstrating the potential of AI tools to enhance student engagement and support learning while maintaining academic integrity (Taneja et al., 2024).

Obstacles of GenAI in Higher Education

While GenAI offers numerous opportunities, its widespread adoption also presents several obstacles that must be addressed to ensure its responsible use in academic settings. These challenges revolve primarily around academic integrity, policy development, and accessibility (Ipek et al., 2023).

One major concern is the challenge of maintaining academic integrity. Studies such as those by Ruano-Borbalan (2025) and Lim et al. (2023) underscore the difficulties that generative AI presents in ensuring that student work is both original and authentic. Lim et al. (2023) specifically points out that while GenAI can elevate the rigor of assessments, it may also render some forms of evaluation redundant, as AI can generate content indistinguishable from that produced by students. Ipek et al. (2023) provides a literature synthesis, highlighting ethical issues regarding GenAI. They note that since ChatGPT does not develop an ethical perception independently, there is the risk of creating an undesirable result, such as the program's ability to answer undesirable or objectionable questions. This impersonable quality is echoed by Baidoo-Anu and Ansah (2023), where they discuss GenAI's lack of contextual understanding and the drawbacks regarding human interaction. Generative models lack the ability to understand context and situation, which can lead to inappropriate or irrelevant responses (Baidoo-Anu & Ansah, 2023). They then further highlight the incapabilities regarding human interaction, which can be a disadvantage for students who benefit from a personal connection.

Despite these challenges, outright banning AI is not considered a feasible solution. Johnston et al. (2024) argues that such a policy would be impractical, especially given the increasing relevance of AI skills in the workforce. A study by Microsoft (2023) supports this argument, noting that over 70% of business leaders would prioritize hiring less experienced candidates with AI skills over more experienced candidates without them. Adding to the complexity, An et al. (2025) document how GenAI policy frameworks at leading universities are in constant flux, reflecting the rapid development of AI tools and the difficulty institutions face in keeping pace. As institutions work to navigate these complexities, the role of clear policies, institutional support, and ongoing dialogue between students, educators, and administrators will be critical in determining how generative AI can best be utilized in higher education (Johnston et al., 2024). While these challenges pose significant barriers to the successful integration of GenAI in education, it is crucial to understand how students themselves are engaging with these technologies and how they perceive their impact.

Student Engagement with GenAI Technologies

The adoption of GenAI tools such as ChatGPT has prompted a significant shift in how students engage with academic assessments and learning. Understanding student interactions with these technologies, as well as how they are learning about them, is crucial for assessing their impact on learning (Rahman & Watanobe, 2023).

The adoption of GenAI tools by students has opened new avenues for academic assistance. OpenAI (2025) used ChatGPT User Data to determine the extent to which college aged students are using ChatGPT and where the gaps in adoption exist. Results show these tools are primarily used for starting papers and projects, summarizing texts, and brainstorming ideas. This aligns with Common Sense Media & Hopelab (2024) study on teen and young adult's perspectives on GenAI, concluding the most common uses of GenAI are for getting information and brainstorming. Abdullahi et al. (2024) extends this to higher education by surveying students and lecturers of higher education institutions across 76 countries (sample size: n = 1240). Results indicate that GenAI is primarily used for information retrieval and text paraphrasing when supporting researchers. Beyond writing and research, students use GenAI for personalized learning support. Chan and Hu (2023) conducted a survey of 399 undergraduate and postgraduate in Hong Kong indicates that students highly value GenAI's usefulness in providing unique insight and personalized feedback, enhancing the learning experience. In this study, students also report using GenAI for writing and brainstorming along with research support, aligning with another existing research. While GenAI tools offer a range of benefits for students, the extent to which students engage with these technologies is influenced by various personal and contextual factors.

One of the key factors influencing whether students use GenAI is their own confidence in their academic skills. According to Johnston et al. (2024), students with higher confidence in their writing abilities are less likely to engage with GenAI tools. This suggests that GenAI may be more appealing to students who feel they need extra support or have lower self-efficacy in academic tasks. Additionally, familiarity with technology plays a significant role in engagement. Students who are comfortable with digital tools are more likely to adopt GenAI in their academic work (Chan & Hu, 2023). This is consistent with technology adoption models, which suggest that perceived ease of use and familiarity with technology are key determinants of adoption (Compeau & Higgins, 1995).

METHODOLOGY

Participants

The survey was made available online to undergraduate and graduate students at the University of Guelph in Ontario, Canada. In the 2024/25 academic year, total enrolment was 33496 students: 90.9% undergraduates (n = 30406) and 9.1% graduate students (n = 3090). The student body was 59.3% female (n = 19849), 37.1% male (n = 12435), and 3.6% another gender identity (n = 1212). Canadian citizens comprised 90.5% of students (n = 30316).

Students self-selected to access the survey, and no incentive was provided for completing it. The survey was advertised in several ways: via announcements in large-enrolment lectures for courses serving a wide variety of programs; through messages provided with links on course websites; and through outreach to student associations, who used their official website, email, and social media accounts to raise awareness of the survey. The survey link remained live and available for completion during most of the Fall 2024 and Winter 2025 semesters.

A total of 1496 survey responses were collected, with a final cleaned sample size of 1265 after removing a total of 231 responses. Of these exclusions: One student was excluded for not providing consent. An additional 210 responses were removed because the students did not answer any of the demographic questions, although partial responses to demographics were still retained. 19 responses were excluded due to missing answers to the question about familiarity with AI tools, which was considered essential to the survey; however, one student who skipped this question but gave detailed answers elsewhere was retained. Lastly, one more response was removed due to nonsensical answers to several open-ended demographic questions and a lack of responses to the core survey items.

Data Source and Research Design

The survey was conducted in strict accordance with ethical guidelines, ensuring participant confidentiality and a clear explanation of the study's purpose. Students were informed that participation was entirely voluntary and that they were not required to answer any specific questions. The researchers did not access any survey data until after final grades had been submitted to the registrar. Students received no compensation or incentives for their participation, nor did they incur any known

costs. The study received approval from the research ethics board before the survey was distributed, and there were no known risks to participants.

The survey included multiple-choice, yes/no, and open-ended questions designed to capture students' experiences and perspectives on AI tools in higher education. The survey was validated prior to distribution. Questions covered students' academic backgrounds (e.g., major, year of study, student status), demographic characteristics (e.g., age, gender identity, ethnicity), and familiarity with AI tools such as ChatGPT. The survey explored patterns of AI use across academic, personal, and professional contexts, including specific tasks, frequency of use, and motivations for using or avoiding AI—particularly in relation to academic integrity, data privacy, and trust in technology. It also addressed faculty encouragement or discouragement of AI use, any consequences for AI-related misconduct, and students' views on AI's impact on learning. Finally, students identified which AI tools they currently use for school-related tasks.

Data Analysis

Data analysis was conducted using Python within the Google Colab environment. Descriptive statistics were generated using Pandas and NumPy to explore trends in AI usage, barriers to adoption, and institutional responses to AI integration. The results were presented using tables and visualizations produced using Matplotlib to support interpretation and highlight key patterns.

For open-ended responses, a thematic analysis was conducted. Initial codes were developed inductively by reviewing a sample of responses and identifying common ideas. Two independent coders then refined and applied the coding framework across the dataset to ensure consistency and reduce potential bias in theme identification. This approach followed the method outlined in Chan and Hu (2023), where coders collaboratively developed a codebook through discussion and consensus after reviewing an initial subset of responses. Inter-rater reliability was assessed using both percent agreement and Cohen's Kappa. The two coders demonstrated a raw percent agreement of 81%, with a corresponding Cohen's Kappa of 0.79, indicating substantial agreement beyond chance. These results suggest that the coding process was applied consistently across raters, providing confidence in the reliability of the qualitative analysis.

Objectives of the Study

The main objectives of this study are to:

- Explore how students at the University of Guelph use artificial intelligence (AI) tools, particularly chatbots like ChatGPT, in their academic work.
- Understand **why** students use AI tools.
- Identify **how** students use AI.
- Determine **when** students started using AI for academic purposes.
- Investigate **how often** students use ChatGPT or similar AI tools for school-related tasks.
- Assess student perceptions and attitudes toward the use of AI in academics
- Find out how students were first introduced to ChatGPT
- Identify reasons why some students **do not** use AI tools for schoolwork.

RESULTS

Demographics

Figure 1 presents the distribution of students by program of study. Participants reported enrollment in 70 distinct programs, but only programs with more than 10 students are shown. While most students (72.4%, n = 916) are enrolled in STEM disciplines, the survey data reflects broad representation across all Colleges. Note that 25 students did not respond to this question.

Figure 2 illustrates that most students (56.3%, n = 712) are in their first year of study. The sample is predominantly composed of undergraduate students, with 5.3% (n = 68) enrolled in graduate or other post-undergraduate programs. Two students selected "Other": One identified as a non-degree student, and the other indicated they were unsure.

Table 1 presents the ages of students, with the majority (66.6%, n = 843) falling between 18 and 19 years old. The next most common age group was 20–21 years old, comprising 15.7% of the sample (n = 199).

Table 2 shows that most students identified as female (60.8%, n = 769) and 32.6% (n = 412) of students identified as male.

Table 3 shows the number of students identifying with various ethnic groups. Only groups with more than 10 students are displayed. Because students could select multiple ethnic identities, the total number of responses exceeds the sample size. 17 of the 1265 students did not report their ethnicity. Ethnicities included in the survey but excluded from 3 due to low response counts are: North African (n = 6), Korean (n = 6), Japanese (n = 6), Indo-Caribbean (n = 5), Indo-Fijian (n = 5), and Indo-African (n = 5). Students could also self-identify their ethnicity; these responses include: Indigenous (n = 7), Persian (n = 2), Jewish (n = 2), and Serbian (n = 1).

A separate demographic question asked about student status. Most students (92.73%, n = 1173) identified as domestic students, while 7.03% (n = 89) identified as international. Three participants did not indicate their student status.

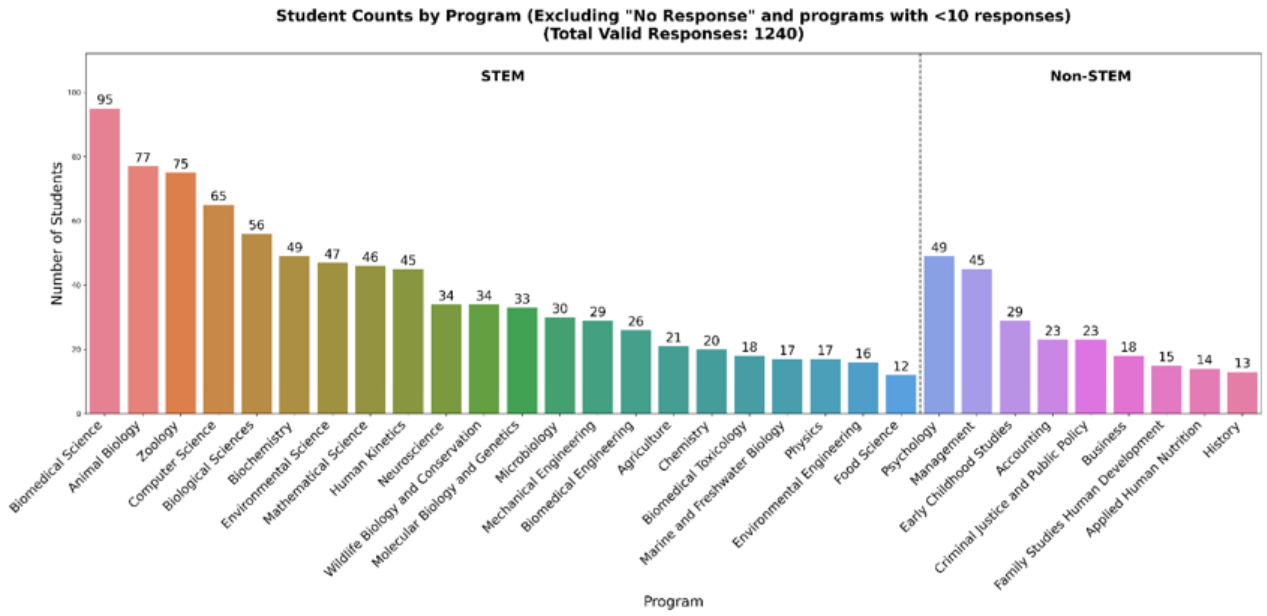

Figure 1. Vertical bar plot detailing number of respondents by program. Programs with less than 10 respondents are excluded. Chart is divided between STEM and Non-STEM programs (Source: Authors' own elaboration)

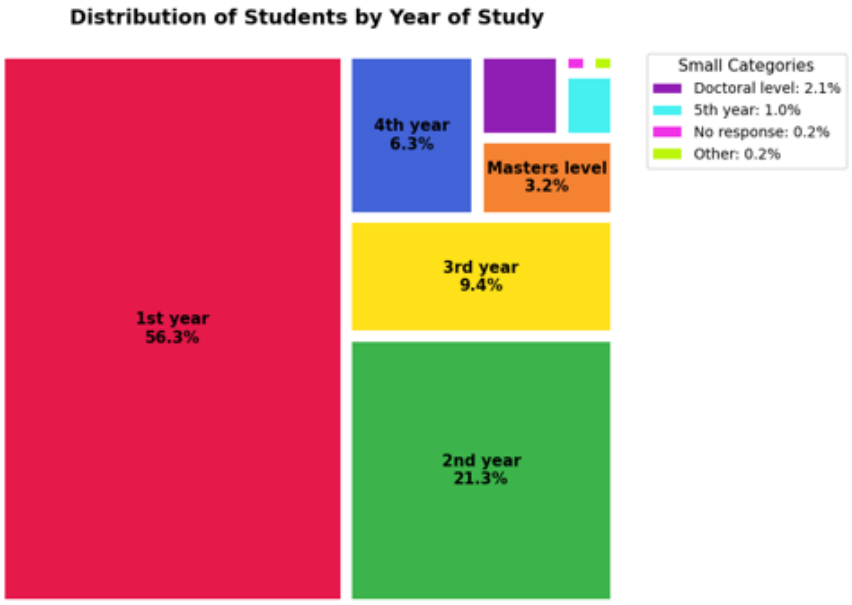

Figure 2. Treemap showing the distribution of student respondents by year of study. Percentages are based on all responses. Categories representing 3% or less of the sample are summarized in a legend (Source: Authors' own elaboration)

Table 1. Age distribution of students (count and percentage)

Age	Frequency	Percentage (%)
Less than 18	45	3.6
18-19	843	66.6
20-21	199	15.7
22-23	79	6.2
24-25	31	2.5
26 and above	63	5.0
No Response	5	0.4

Table 2. Distribution of students by gender identity (count and percentage)

Gender identity	Frequency	Percentage (%)
Female	769	60.8
Male	412	32.6
Non-binary	25	2.0
Gender fluid	8	0.6
Agender	7	0.6
Gender queer	7	0.6
Prefer to self-describe	3	0.4
Prefer not to answer	25	2.0
No response	9	0.6

Table 3. Number of student respondents selecting each reported ethnicity, limited to categories with at least 10 selections. Students could select multiple options

Ethnicity	Number of students
White	917
South Asian	117
Chinese	70
Mixed	58
Black	45
Latino/a/x	36
West Asian & Middle East	33
Arab	32
Southeast Asian	31

Table 4. Distribution of students' self-rated familiarity with AI tools. Responses are shown as percentages of all answers

Response category	Percentage (%)
I am familiar with these tools and use these tools sometimes	49.6
I am familiar with these tools and use these tools frequently	36.6
I am familiar with these tools but do not use these tools	13.3
I have not heard about or used these tools	0.5

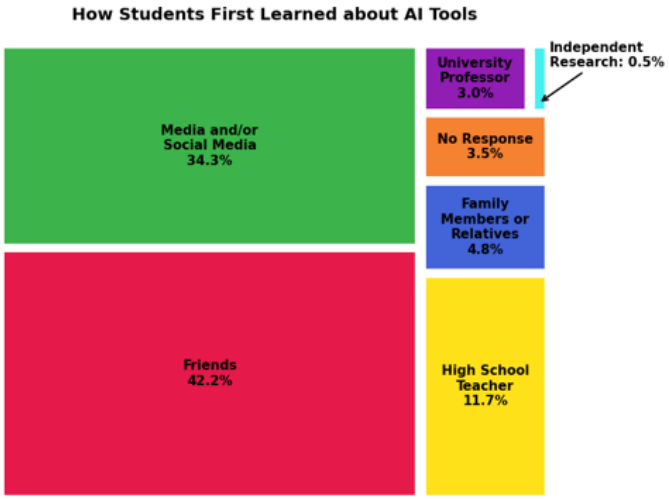

Figure 3. Tree map chart showing how students were first introduced to AI tools by percentage of all answers (Source: Authors' own elaboration)

Student Perceptions of AI tools

Table 4 presents students' reported familiarity with AI tools. Most students surveyed (86.2%, n = 1090) indicated they are familiar with AI and use such tools at least occasionally.

When disaggregated by gender, 51.89% of female students (399 out of 769) reported occasional use, compared to 44.66% of male students (184 out of 412). Additionally, frequent use was reported by 35.63% of females (n = 274) and 39.81% of males (n = 164).

Age-based patterns were similar. Among students under 20, 49.32% (438 out of 888) reported occasional use, nearly matching the 49.07% (185 out of 377) among those over 20. Frequent use was slightly more common among younger students, 36.82% (n = 327) compared to 33.16% (n = 125) of those over 20.

Figure 3 shows that just over 42.2% (n = 460) of the 1090 students who identified that they use AI first learned about AI tools from friends, closely followed by media and social media at 34.3% (n = 374).

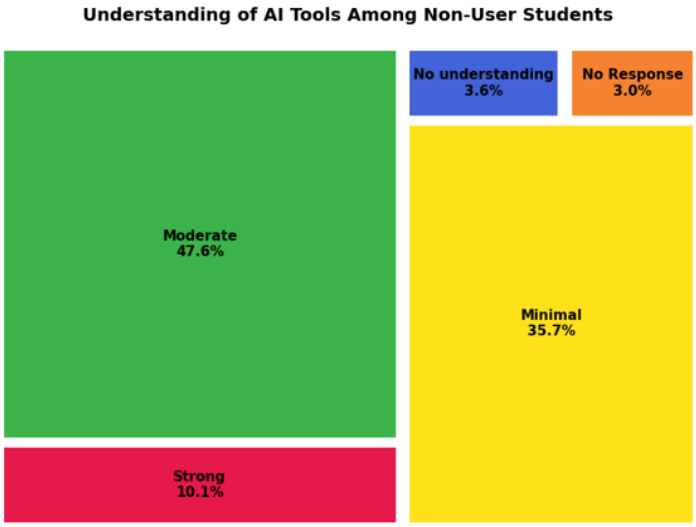

Figure 4. Tree map showing the self-reported level of understanding of AI tools, by percentage of respondents who are aware of AI tools but do not use them (Source: Authors' own elaboration)

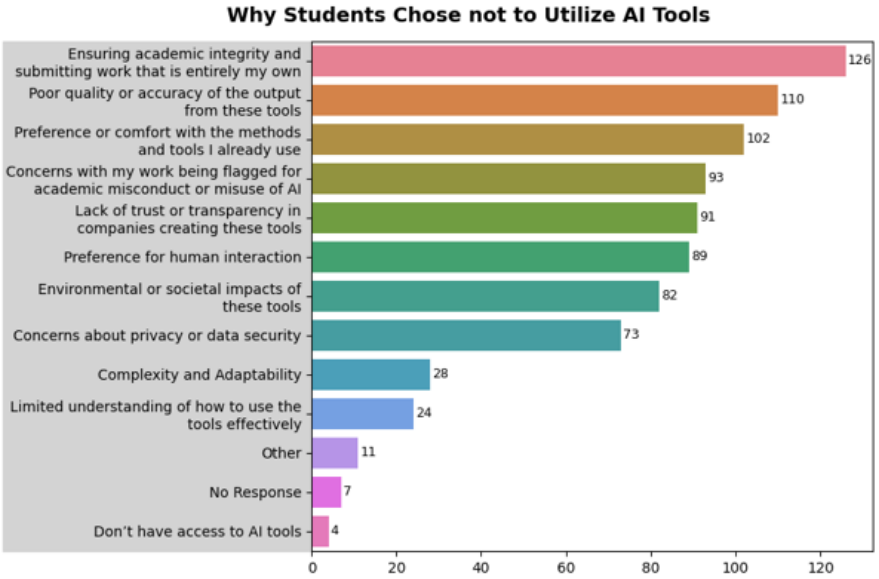

Figure 5. Horizontal bar plot depicting number of students selecting different reasons for not using AI tools. Values represent the number of students who selected each option. Multiple selections were allowed (Source: Authors' own elaboration)

When disaggregated by gender, female students most frequently reported learning about AI from friends (40.3%, 310 out of 769) and media or social media (24.7%, n = 190). Male students followed a similar pattern, with 33.3% (137 out of 412) learning from friends and 36.4% (n = 150) from media or social media. Learning from high school teachers was more common among females (11.7%, n = 90) than males (6.8%, n = 28), while exposure through university professors remained relatively low across both groups: 2.9% of females (n = 22) and 1.9% of males (n = 8).

Age-based patterns revealed similar trends. Among students under 20, 34.2% (328 out of 960) learned about AI from friends and 24.2% (n = 233) from media or social media. High school teachers were also a notable source for this group, cited by 12.5% (n = 120). In contrast, among students aged 20 and older, 27.8% (133 out of 478) reported learning from friends, while 29.5% (n = 141) cited media or social media. University professors were more commonly cited by older students (4.2%, n = 20) compared to those under 20 (1.4%, n = 13).

When students were asked which AI tools they currently use for school-related tasks, ChatGPT was by far the most reported, with 606 students indicating its use. This was followed by Copilot with 67 responses, and Gemini with 51. Other tools used by 10 or more students included Grammarly (30), Claude (17), Gauth (15), and NotebookLM (10).

Students who reported knowing about AI tools but not using them were directed to an abbreviated version of the survey. Of the 1265 total survey responses, 168 respondents fell into this category. As seen in **Figure 4**, most students who do not use AI tools rate their understanding of AI as either moderate or minimal.

Figure 5 presents the reasons these students gave for not using AI tools; note that multiple responses were allowed. The most common reason cited was concern about academic integrity (n = 126). Although no student selected "preference to develop knowledge and skill through other methods" as a listed option, this theme emerged in four out of the 11 open responses.

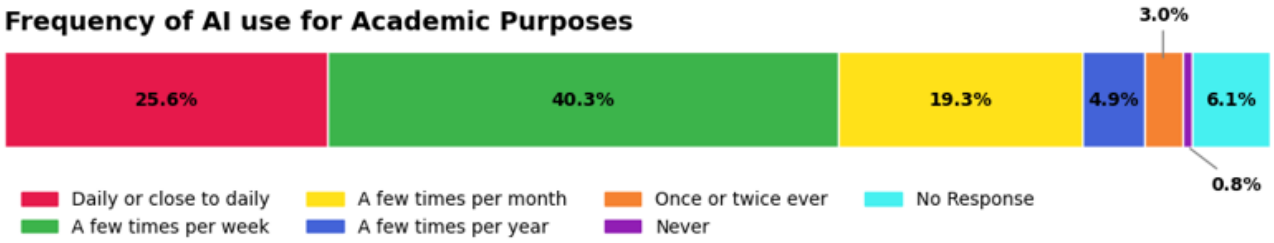

Figure 6. Stacked bar plot showing students' reported frequency of AI use. Responses range from "Daily to close to daily" to "Never," including "No Response" (Source: Authors' own elaboration)

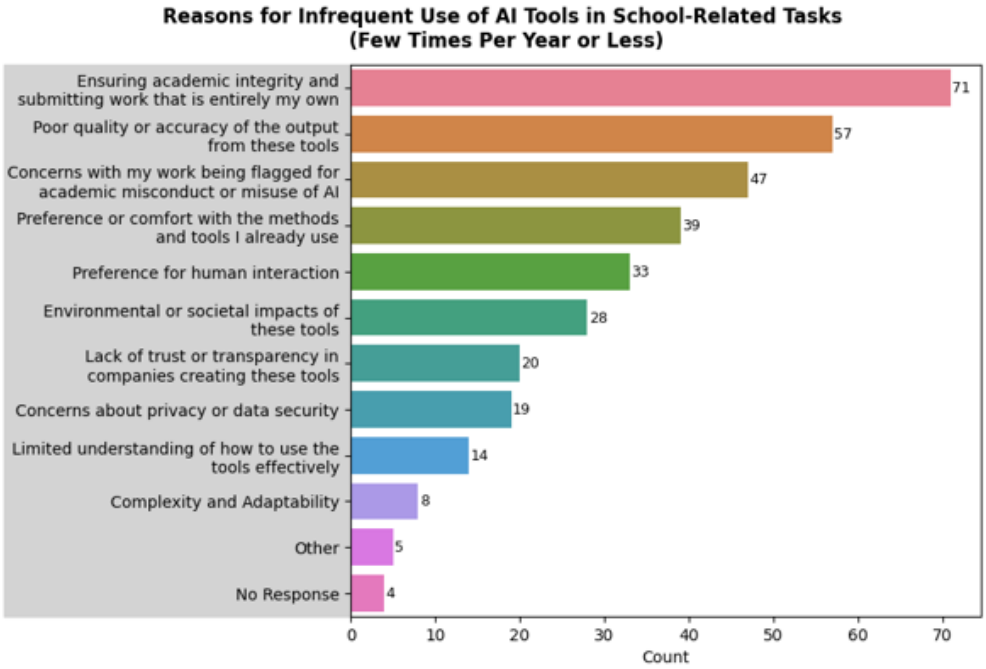

Figure 7. Horizontal bar graph depicting counts of responses to "What reasons do you have for using AI tools a few times per year or less for school-related tasks?" Values represent the number of students who selected each option. Multiple selections were allowed (Source: Authors' own elaboration)

Additionally, five students expressed moral or ethical concerns about how AI is developed and used. One student reported having no interest in AI, and another was unwilling to pay for access.

AI tools for Academic Purposes

AI tools are increasingly being integrated into academic environments, offering support across a variety of educational tasks.

Figure 6 shows that among students who use AI tools (n = 1090), the majority (65.9%, n = 718) report using them for schoolwork at least a few times per week. Among the 10 students who reported never using AI for school, the most common reasons were concerns about academic integrity and originality (n = 8), satisfaction with their existing tools (n = 6), and dissatisfaction with the quality of AI tools (n = 6).

Students who reported using AI only a few times per year were asked to explain their infrequent use. As shown in **Figure 7**, the 86 students in this group most commonly cited concerns related to academic integrity (n = 71), poor quality of AI tools (n = 57), and the potential for academic misconduct allegations (n = 47). In the open-ended responses, additional reasons included a general dislike of interacting with AI, with one student describing its use as "inhumane." Other students noted that they only used AI when required, could not recall their reasoning, or preferred not to rely on it.

The survey also asked whether professors had required students to use AI tools for their coursework. Among the 168 students who are aware of AI tools but do not use them, 66.07% reported not being required to use AI, while 29.17% said they were. Similarly, among AI users (n = 1090), 59.08% reported not being required to use AI, and 25.13% said they were.

Figure 8 and **Table 5** compare the responses of students who use AI tools with those who do not. A greater proportion of non-users report that their teachers or professors prohibit AI use. Among students under 20, 70.9% of non-users (82 out of 117) reported that their high school teachers ban AI tools, compared to 36.86% of users (282 out of 765), a difference of 33.23%. Across all students, 36.90% of non-users (62 out of 168) said their professors prohibit AI use, compared to 17.80% of users (194 out of 1090), a 17.6 % difference. This aligns with the findings in **Figure 5** in **Figure 7**, where non-users and low frequency users primarily cite concerns about academic integrity as a reason for avoiding AI.

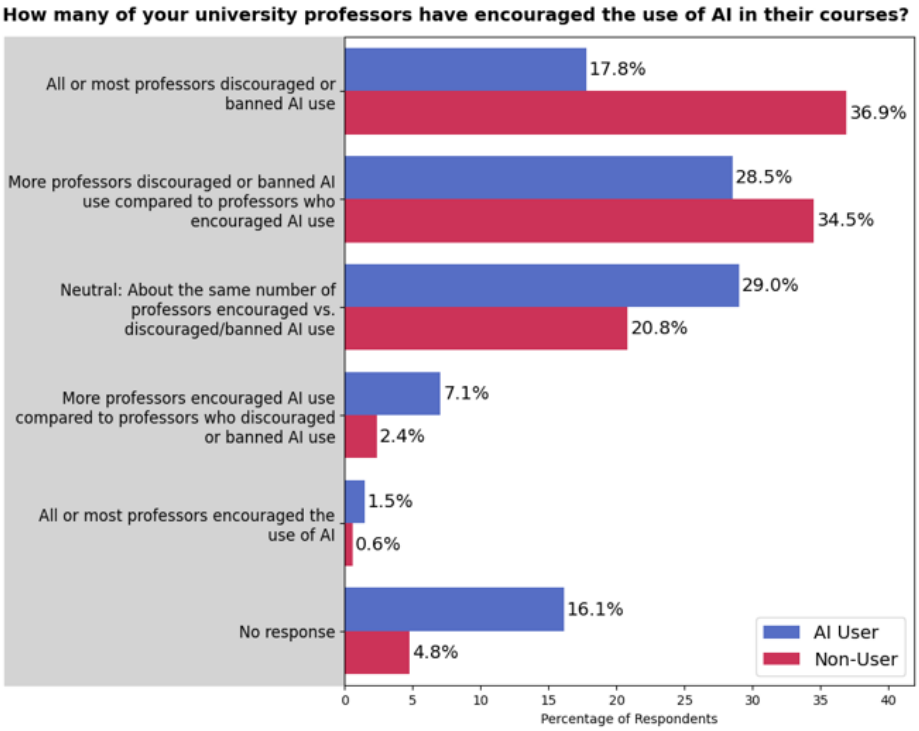

Figure 8. Horizontal bar plot showing perceived faculty attitudes toward AI use in university courses, grouped by students' self-reported AI tool usage. Bars show the percentage of respondents in each usage group selecting each response category (Source: Authors' own elaboration)

Table 5. Students' perceptions of high school teacher attitudes toward AI use by frequency and percentage (students <20 years of age

	Non-AI user		AI user	
	Frequency	**Percentage (%)**	**Frequency**	**Percentage (%)**
All or most teachers encouraged the use of AI	0	0	8	1.05
More teachers encouraged AI use compared to teachers who discouraged or banned AI use	3	2.56	28	3.66
Neutral: About the same number of teachers encouraged vs. discouraged/banned AI use	6	5.13	125	16.34
More teachers discouraged or banned AI use compared to teachers who encouraged AI use	21	16.95	192	25.10
All or most teachers discouraged or banned AI use	82	70.09	282	36.86
No Response	5	4.27	130	16.99

AI use for Academic Written Assignments

Among the 1080 students who indicated that they have used AI tools for school-related tasks, 53.8% (n = 581) reported using AI to assist with academic written assignments, while 39.4% (n = 425) stated they had not used AI for this purpose. The non-response rate was 6.9% (n = 74).

Among students who reported using AI tools to assist with academic written assignments, **Figure 9** shows that usage frequency varied. Most students report either sometimes (34.6%, n = 202) or often (32.7%, n = 190) using AI for written assignments.

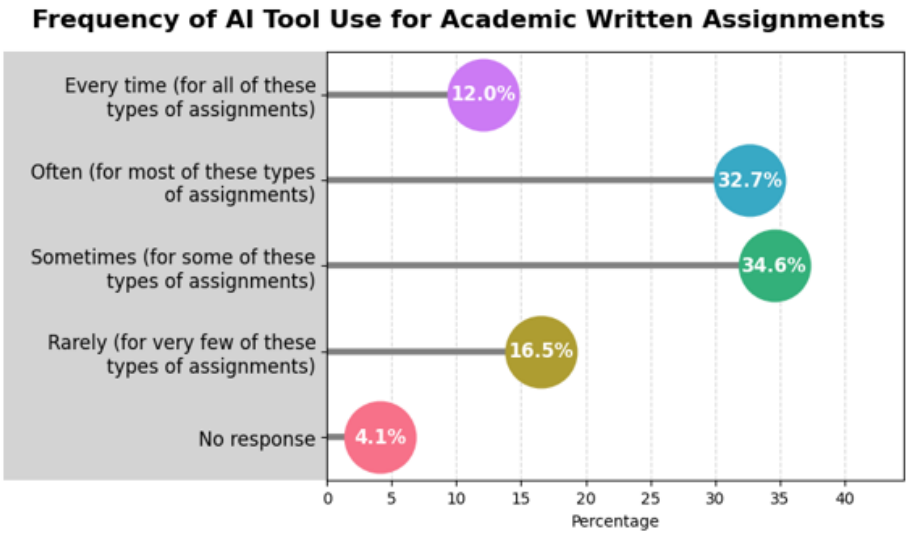

Figure 9. Frequency of AI tool use for academic written assignments, based on responses from students who reported using AI for such tasks. Percentages represent the proportion of respondents selecting each option (Source: Authors' own elaboration)

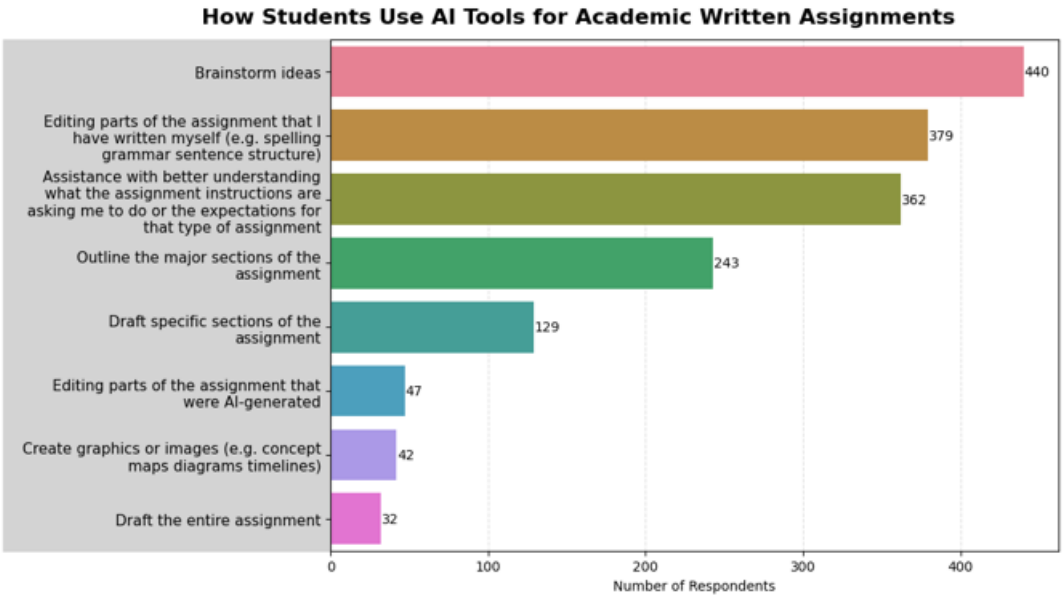

Figure 10. Distribution of student-reported AI tool usage across various academic writing tasks. Values represent the number of students who selected each option. Multiple selections were allowed (Source: Authors' own elaboration)

Figure 10 illustrates that students who use AI for written assignments (n = 581) most commonly used AI for brainstorming (n = 44), editing their own writing (n = 379), and clarifying assignment expectations (n = 362). Moderate use was reported for outlining (n = 243) and drafting sections (n = 129), while relatively few used AI to edit AI-generated text (n = 47), create visuals (n = 42), or draft entire assignments (n = 32).

AI Use for Academic Problem-Solving Tasks

Among the 1080 students who indicated that they have used AI tools for school-related tasks 46.6% (n = 503) reported using AI tools to support tasks involving visual representation, coding, problem-solving, or analysis, whereas 43.5% (n = 470) indicated they had not. The non-response rate was 9.9% (n = 107).

Figure 11 shows that frequency of AI tool use for visual, coding, problem-solving, or analytical assignments varied among users. While 15.5% (n = 78) reported rarely using AI for these tasks, a combined 79.4% (n = 403) used it at least sometimes, and only 7.6% (n = 38) reported consistent use. A small portion (5.1%, n = 26) did not respond.

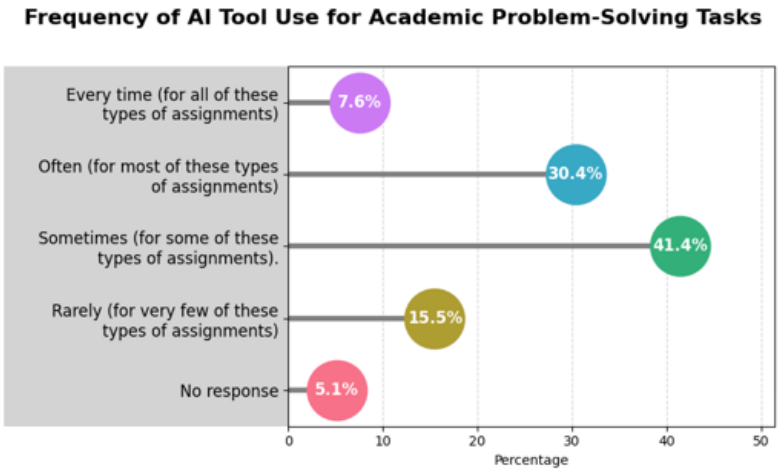

Figure 11. Frequency of generative AI tool use for academic assignments involving visual representation, coding, problem-solving, and analysis, based on responses from students who reported using AI for such tasks. Percentages represent the proportion of respondents selecting each option (Source: Authors' own elaboration)

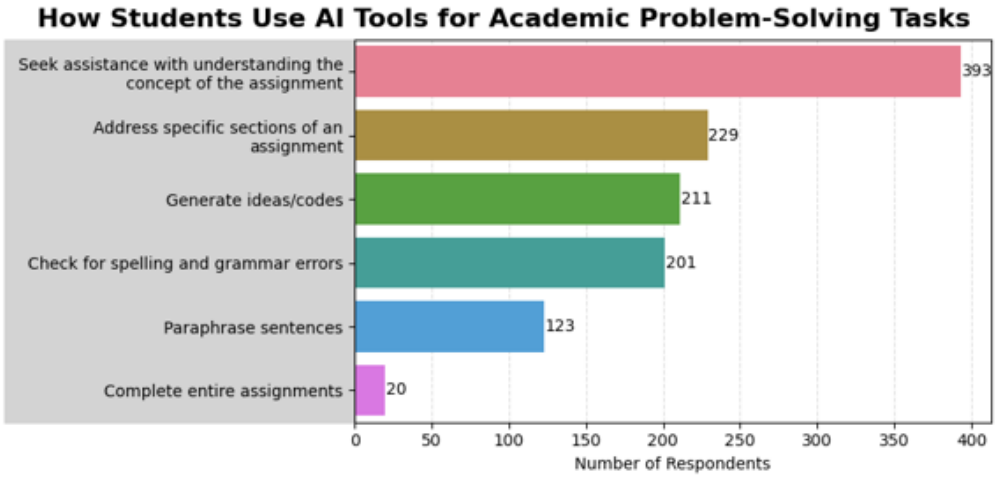

Figure 12. Self-reported frequency of different AI tool uses for academic problem-solving among student respondents. Values represent the number of students who selected each option. Multiple selections were allowed (Source: Authors' own elaboration)

Figure 12 represents the frequencies of AI use for academic problem-solving tasks among the 503 students who reported using AI for these tasks. Students most frequently used AI to help understand assignment concepts (n = 393), followed by support with specific sections (n = 229), idea or code generation (n = 211), and grammar checking (n = 201). Paraphrasing (n = 123) and completing entire assignments (n = 20) were less commonly reported.

Figure 13 summarizes the coded themes from open-ended responses regarding AI use across three survey questions regarding AI use for academics. Students most frequently reported using AI to explain concepts (n = 143), followed by step-by-step solutions (n = 62) and content summaries (n = 57).

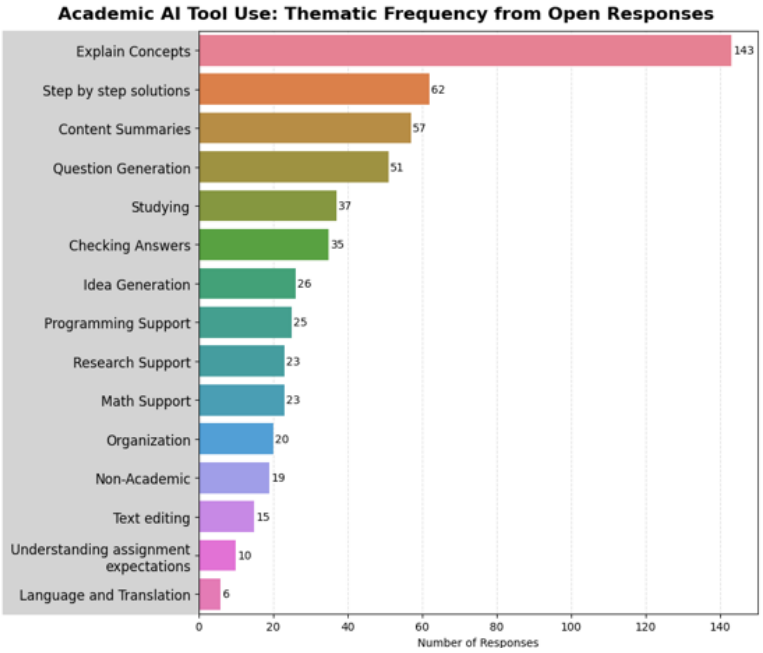

Figure 13. Horizontal bar chart illustrating the frequency of academic AI tool use themes based on open-ended responses. Themes were standardized and aggregated to highlight common patterns. Values indicate the number of students who mentioned each theme; multiple mentions per respondent were possible (Source: Authors' own elaboration)

Below are selected open responses to the prevalent themes.

Explaining Concepts

The most reported use of GenAI was as a means of clarifying difficult material from lectures and readings, especially in moments where traditional academic support was inaccessible. One student noted:

> To clarify instructions as well as helping me to understand certain topics that I need a detailed and specific answer about.

This highlights a desire not just for simplification, but for tailored, in-depth explanations. Another student described how they:

> Ask it to explain concepts… in different ways.

especially when working through confusing questions or assignments. This theme was echoed repeatedly in responses such as "help explain things in a different way" and simply "explaining concepts," indicating how central this function has become in students' learning workflows.

Step-by-step Solutions

Closely tied to conceptual explanation was the theme of guided problem solving. Students described using AI to work through complex questions when answer keys or full solutions were unavailable. As one respondent explained:

> It is very useful for learning how to complete complex calculations. Rather than searching through notes, you can ask it how to solve a problem, and it will teach you step by step.

Another student elaborated on how this process fits into their study habits:

> When attempting quizzes, I will do the question myself first and if it's wrong, I'll ask ChatGPT to explain it, then I try the question again which allows me to learn and retain information more effectively.

AI was also valued for helping verify uncertain answers, particularly in STEM disciplines where solution manuals are often limited:

> Check if an answer I got for a physics problem is correct when there is no answer key available… plus AI can give step by step solutions sometimes when answer keys only give a single number answer.

Content Summarization

Another prominent use involved summarizing academic material particularly lengthy readings, slide decks, and research articles. Students described how generative AI helped them distill and comprehend content that would otherwise be difficult or time-consuming to process. For instance, one respondent shared:

> I use AI to summarize lecture slide decks and explain general course concepts in different words.

Others reported using AI to summarize "articles that I'm using as sources" and for "source summary and grammar analysis." One student succinctly captured the multidimensional role of AI in academic writing and reading:

> Summarization, finding sources, summarizes ideas, assisting with problem solving.

Question Generation

Students also described using AI to support retrieval-based learning strategies, such as flashcards, practice quizzes, and test simulation. One respondent shared:

> Creating study guides/flashcards to study from [and] generate quizzes for practice.

Another wrote:

> Use it to make me practice quizzes on topics from my personal notes.

These uses often involved transforming existing notes or readings into active recall tools. In some cases, students used AI to increase the difficulty of practice questions to better simulate exam conditions:

> If I'm studying for a test I copy and paste the test review into ChatGPT and ask it to give me similar but more difficult questions so I can practise those before completing the test review.

AI Use for Quizzes and Tests

Among the 1080 students who indicated that they have used AI tools for school-related tasks, 47.9% (n = 517) reported that they have not used AI tools to assist with completing online quizzes or tests for their university courses. On the other hand, 38.1% (n = 411) indicated that they have used AI tools for this purpose. The remaining 14.1% (n = 152) did not respond to the question.

Consequences for AI Use

Of the 828 students who reported using AI on assignments, tests, or exams, 3.5% (n = 29) indicated they faced consequences for doing so in situations where use was either prohibited or the guidelines were unclear. Among these, 48.4% (n = 15) received a warning or had a conversation, 35.5% (n = 11) had their grade reduced to zero, and 16.1% (n = 5) were required to redo the work. Students could select multiple consequences. No respondents reported receiving academic probation or formal disciplinary action. Additionally, 19.8% (n = 164) of students indicated they had not received any punishment, while 76.6% (n = 635) did not specify if they had faced consequences.

Of the 29 students who reported receiving disciplinary action for using AI, 20 said they used it for brainstorming, 17 used it to clarify assignment instructions, and 17 students also used it to edit their own writing. It is important to note that students were not asked in the survey which specific use of AI led to the disciplinary action.

In total, 49 students reported using AI to complete entire assignments (writing or academic) as shown in **Figure 10** and **Figure 12**. Of these students only two reported any academic consequence for doing so. One student reported having a meeting regarding AI use and having to redo the assignment and another student who used it on quizzes reported occasionally receiving a zero grade for submitting work generated by AI.

Among the 243 students who reported using AI to outline the major sections of an assignment (**Figure 10**), only 14 (5.76%) indicated they had faced any discipline. Of the 129 students who used AI to draft specific sections of a writing assignment, just nine (6.24%) reported disciplinary consequences. Similarly, among the 229 students who used AI to address specific sections of a problem-solving assignment (**Figure 12**), only 11 (2.17%) reported being disciplined.

Perception of How AI Tools Impact Learning

Overall, students were divided in their perceptions of how AI tools impact their learning, with similar proportions viewing the impact as positive (32.0%, n = 404) and negative (31.1%, n = 393). **Figure 14** presents these perceptions stratified by frequency of AI use, where "frequent users" are defined as those using AI tools at least weekly, and "infrequent users" as those using them less often. Among the 718 frequent users and 372 infrequent users, 14.3% (n = 103) of frequent users reported an extremely positive impact, compared to just 2.5% (n = 8) of infrequent users. Conversely, only 3.3% (n = 24) of frequent users reported an extremely negative impact, compared to 5.6% (n = 21) of infrequent users.

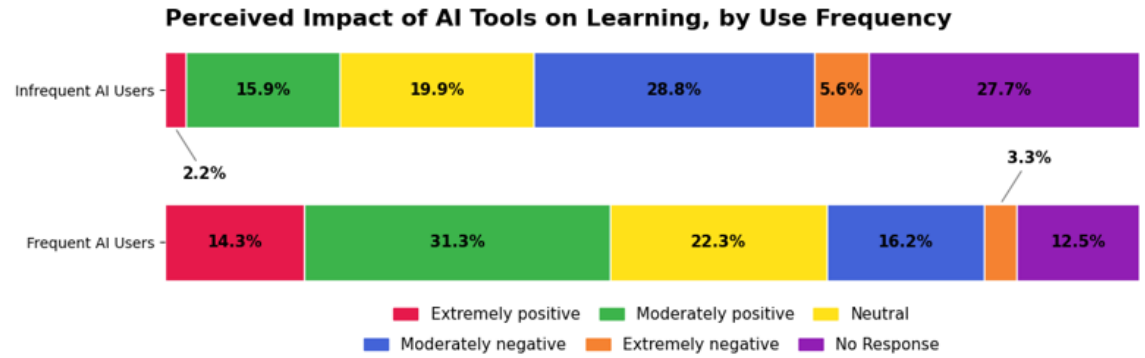

Figure 14. Stacked bar chart showing students' perceptions of how AI tools affect their learning, grouped by frequency of academic AI use. Responses range from "Extremely positive" to "Extremely negative," including "No Response" (Source: Authors' own elaboration)

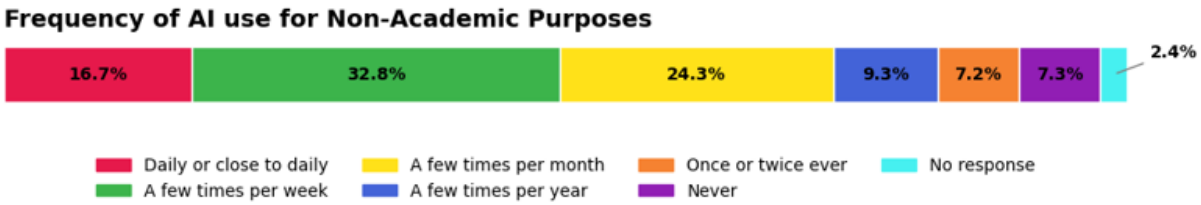

Figure 15. Stacked bar plot of students' reported frequency of AI use for non-academic tasks. Responses range from "Daily to close to daily" to "Never," including "No Response" (Source: Authors' own elaboration)

Table 6. Frequency of responses to the question: "What tasks (non-academic) have you used AI tools to assist you with? Items under the "Themes" header represent categories identified by researchers from open-ended responses

Responses	Frequency	Themes	Frequency
Researching information	535	Academic uses	35
To learn a new topic or skill	456	Entertainment and games	17
Writing emails	381	Code/debugging code	13
Writing text messages	122	Writing support	12
Acting as a personal assistant	9	Creative content	12
No Response	142	Emotional Support	6
		Technical Support	4
		Do not use	3

AI Tools Non-Academic Purposes

Beyond academic contexts, students also reported a wide range of non-academic uses for AI tools.

Figure 15 shows that nearly half of students (49.45%, n = 539) report using AI tools for non-academic purposes a few times a week or more. Another 24.22% (n = 264) use AI a few times per month, while 23.85% report rarely using it, with usage less than a few times per year. 27 students chose not to indicate their frequency of AI use for non-academic purposes.

Table 6 shows that students primarily use AI as a search engine (n = 535), for learning new skills (n = 456), and for writing emails (n = 381). Categories under "Themes" represent themes identified by researchers from open-ended responses. In these responses, students most commonly reported using AI for entertainment, coding, and creative pursuits. Several students highlighted its usefulness for debugging code, generating images, and enhancing tabletop or video games. For example, one student described using AI to "create image(s) for games," while another said they use it "to analyze song lyrics." On the technical side, a student shared using AI for "automotive research/tutorials and guides on how to do something, for example how to build a PC or fix a broken component in my car."

Notably, six students reported using AI for emotional support, with one explaining it helped "to work through problems between therapy sessions" and "to feel validated," and another using it "to give me perspectives on interpersonal issues." One student indicated using AI for medical advice.

DISCUSSION

This study examines how university students engage with generative artificial intelligence (GenAI) technologies, particularly ChatGPT. Study findings add to evidence suggesting a growing trend of GenAI adoption, while also highlighting the complex ways in which institutional culture, individual perceptions, and ethical concerns shape its use. While our results align with previous

literature, they offer more detailed insight into how students are applying GenAI tools across a variety of academic contexts and reveal important implications for teaching and policy.

The results show that AI adoption among university students is widespread, with most students who participated in the survey reporting regular academic use (**Figure 6**). This mirrors usage trends observed in Chan and Hu (2023) where students expressed a positive attitude toward integrating GenAI technologies in their learning practices. Among the 1080 students in our sample who reported using AI tools for school-related tasks, 53.8% indicated using them for academic written assignments such as essays and reports, while 46.6% had used AI for technical tasks like coding, data analysis, or visual representation. This closely aligns with findings from Johnston et al. (2024), where 51% of respondents reported academic use. These frequency patterns point to a broad adoption of GenAI across multiple types of academic tasks.

A comparison between academic and non-academic engagement reveals an important contrast. While 40.3% of students reported using AI for academic tasks a few times per week, only 25.1% reported similar frequency for non-academic purposes (**Figure 6** and **Figure 15**). Daily academic use was also nearly double (25.6% vs. 13.0%), suggesting students primarily view GenAI as a learning tool.

A more nuanced understanding of student engagement emerged from both open-ended and structured responses throughout the survey. Rather than using GenAI to complete full assignments, students primarily applied it to support their independent work. This included revising their writing, clarifying assignment expectations, brainstorming ideas, and improving their understanding of complex concepts (**Figure 10** and **Figure 12**). In technical subjects, they reported using GenAI to assist with specific components such as code debugging or solving math problems. Many relied on step-by-step explanations, particularly when formal resources like answer keys were unavailable (**Figure 13**). Students frequently described ChatGPT as a reliable source of clarification during independent study, especially when faced with unclear instructions or unfamiliar material. These patterns suggest that GenAI is functioning as a pedagogical support tool, consistent with Baidoo-Anu and Ansah's (2023) framing of ChatGPT as a "personal tutor," particularly valuable in large-class settings or for students navigating language barriers. This also aligns with findings by Chan and Hu (2023) and Johnston et al. (2024), who observed that students commonly use GenAI to deepen content understanding, improve writing, and generate ideas. Students in the open-ended responses also discussed using GenAI for retrieval practices and elaborating on concepts and questions, which are two evidence-based strategies for effective learning (Roediger & Pyc, 2012). Overall, these uses reflect a tendency to integrate GenAI into learning routines in ways that enhance academic engagement rather than replace cognitive effort.

While the primary focus of this study was on academic applications of GenAI, student responses also revealed notable patterns of non-academic use. As illustrated in **Table 6**, students reported employing AI tools for a range of personal and professional activities, including writing emails and informal information seeking. A small number of respondents also described using GenAI for emotional support, such as managing stress or seeking motivational input. These findings align with those of Divekar et al. (2024), who found that 61.4% of surveyed students at Bentley University used ChatGPT for non-academic purposes including recreation, composing social media content, and addressing emotional or interpersonal concerns. Although less frequent than academic use, these non-academic engagements demonstrate the broader integration of GenAI into students' digital literacies and day-to-day problem-solving. They reflect the varied and personalized ways students are incorporating AI tools into their broader university experience.

Despite the benefits of GenAI, student engagement remains cautious and context dependent. Among infrequent users, concerns about academic integrity and doubts about the reliability of AI-generated content were more frequently cited than unfamiliarity with the technology (**Figure 7**). Theses response may also reflect the influence of social desirability bias. Students might emphasize integrity because it is viewed as the "appropriate" or institutionally expected answer, rather than their sole or actual motivation. This potential bias should be considered when interpreting self-reported reasons for AI non-use. As **Figure 6** shows, most students were aware of or had tried GenAI, yet many chose not to use it regularly. This indicates that non-use is driven more by ethical hesitation and performance concerns than lack of exposure. These findings nuance those of Chan and Hu (2023), who found a positive correlation between students' knowledge of GenAI and their willingness to use it in the future. These concerns extend to broader issues of fairness in assessment, especially when GenAI is used to bypass independent intellectual effort (Lim et al., 2023). In line with this, only 38.1% of students reported using GenAI in evaluative settings such as quizzes or tests suggesting that students differentiate between formative academic support and high-stakes assessment. This cautious stance echoes what Abdullahi et al. (2024) describe as "attitudinal ambiguity," wherein students acknowledge GenAI's usefulness but remain uncertain about its legitimacy in regulated contexts.

Institutional norms appear to play a key role in shaping these attitudes. Students who reported limited or no use of GenAI more frequently reported that their instructors discouraged or banned AI tools (**Figure 8**), while more frequent users typically encountered neutral or supportive environments. Inconsistent messaging from faculty contributes to this uncertainty, particularly in ethically sensitive situations. Concerns about misconduct were cited most often by non-users already familiar with GenAI (**Figure 5**), suggesting that many students choose not to engage due to ambiguous or absent guidance. These patterns are consistent with findings by Sajja et al. (2025), who noted that unclear institutional policies can dampen student willingness to engage with AI tools. Although this study did not assess policy attitudes directly, our results support previous research calling for greater institutional clarity. Johnston et al. (2024), for example, found that over 40% of students favored centralized AI guidelines. Without such clarity, students may default to risk-averse behaviors, limiting constructive or innovative uses of GenAI in academic settings.

Student attitudes toward GenAI's role in learning are divided. As shown in **Figure 14**, respondents were nearly evenly split, with 32.0% perceiving a positive impact on learning and 31.1% identifying a negative one. This tension reflects findings from

Johnston et al. (2024) and Krause et al. (2025), which similarly observed that students often appreciate GenAI's convenience but remain anxious about its long-term effects on academic standards and learning outcomes.

CONCLUSION

Among the students surveyed, most reported being aware of AI tools and using them at least occasionally, with ChatGPT identified as the most commonly used platform. Awareness appeared to be driven largely by peers and social media. In this sample, academic use of AI was reported more frequently than non-academic use. Academic applications included brainstorming, editing, and clarifying assignment expectations, while non-academic uses focused on information retrieval, skill development, and writing support.

Students who reported avoiding AI tools cited concerns about academic integrity, doubts about the quality of AI-generated output, and personal preferences. These students also more frequently reported having been taught by educators who discouraged or banned AI use.

Open-ended responses highlighted that some students find AI tools particularly useful for explaining concepts and providing step-by-step guidance. However, perspectives on the overall usefulness of AI for learning were mixed. The responses reflect a range of attitudes and experiences, underscoring that student engagement with AI tools is varied and shaped by both personal and institutional influences. These findings should be interpreted within the context of the surveyed group and not assumed to represent all university students.

LIMITATIONS

This study offers valuable insights into student use and perceptions of generative AI tools, particularly ChatGPT, in an academic context. Here, a few limitations of this work will be acknowledged and discussed.

First, the study relies on self-reported survey data, which can be subject to response bias and inaccuracies in recall. As an example, students may underreport their actual use of ChatGPT, especially in relation to academic tasks that may be perceived as ethically questionable; this is true even though it was made very clear that the survey data would be kept strictly anonymous. This limitation may affect the reliability and objectivity of the data collected.

Second, the sample is drawn exclusively from the University of Guelph. While this provides a focused snapshot of student experiences within one institutional context, it limits the generalizability of the findings. Students at other universities, particularly in different geographic or cultural settings, may engage with AI tools in ways that differ significantly from those observed in this study.

Another important consideration is the rapid pace of change in the AI landscape. Tools like ChatGPT are continually evolving, and public discourse, institutional policies, and student behaviors are likely to shift accordingly. As a result, the study's findings may have limited relevance over time and should be interpreted within the context of current technological conditions.

Finally, this research captures student attitudes and behaviors at the single point of time at which they responded to the survey. While useful for identifying current trends, this approach does not account for how student engagement with AI may change over the course of their academic careers. Longitudinal studies would be better suited to tracking the evolving relationship between students and AI tools, providing a more nuanced understanding of long-term impacts.

RECOMMENDATIONS FOR FUTURE STUDY

Given the rapidly evolving nature of generative AI tools and their increasing impact on higher education, several promising avenues for future research emerge from this study. Longitudinal research designs are needed to track how students' use of AI—and their attitudes toward it—change over time, offering a deeper understanding of how behaviors and institutional responses develop throughout their academic journey, from high school to university. Additionally, expanding research across various academic disciplines and types of universities can highlight important differences in how AI is adopted, perceived, and integrated into coursework. While this study centers on the student perspective, future research could examine instructors' attitudes and practices regarding AI in the classroom to provide a more comprehensive view of its role in teaching and learning. Tracking how generative AI tools evolve over time is also important, as changes in their capabilities and integration into education are likely to shape both teaching practices and policy responses.

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conform to the University's ethical standards and the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans, 2nd Edition (TCPS2). Written informed consents were obtained from the participants.

AI statement: The authors stated that no generative AI or AI-based tools were used in the writing, analysis, figure preparation, or editing of this manuscript.

Declaration of interest: No conflict of interest is declared by the authors.

Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author. Fulfillment of these requests will be subject to the permission of the Research Ethics Boards at University of Guelph.

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