Conversations with a purpose: the impact of ChatGPT among higher education students

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Abstract

Artificial intelligence (AI) tools are reshaping social structures. Multiple international organisations are alerting about the benefits as well as risks associated with the deployment of this technology. Large Language Models (LLMs) like ChatGPT, a conversational AI, emerges as a notable player, offering dynamic interactions with humans. This study focuses on how this tool challenge traditional learning paradigms and how students use ChatGPT to obtain information.

This study seeks to understand the extent and nature of ChatGPT's use in academic contexts based on a survey of under- and postgraduate students (n=1,372 students) in Spain from different areas of knowledge. The questionnaire evaluates the frequency of ChatGPT usage in various academic activities, including homework, classroom interactions, knowledge reinforcement. At the same time students were asked how much they rely on the obtained results from the AI. The responses illustrate the moderate level of trust in ChatGPT as well as the different use depending on the academic disciplines. The study offers revealing results on how students reflect on their own learning process, the future of education and the role of instructors along their academic progress.

A significant finding underscores ChatGPT's rise as the primary educational information source, surpassing long-established mediums like textbooks and online resources. Additionally, videos maintain a robust position as a secondary source of information. This research casts light on the shifting preferences and trends in modern educational tools, underscoring the pivotal role of AI-driven platforms in today's academic endeavours.

Introduction

At the time of writing this study, Chat Generative Pre-Trained Transformer (ChatGPT) was the fastest-growing application in history, obtaining over a million subscribers in less than a week (Farrokhnia et al, 2023) and reaching 100 million active users two months after its launch on 30 November 2022 (Hu, 2023). This groundbreaking software became so popular due to the ease of interaction thanks to the use of natural language. These models have been trained on massive volumes of written and audiovisual material and can make predictions and inferences after certain words (Lin, 2023). It may even produce human-like interactions (Susnjak, 2022), sometimes undistinguishable from writing by humans (Elkins and Chun, 2023). Through that generation of content, ChatGPT presented multiple opportunities to produce from simple texts, writing code to academic writings (Lim et al, 2023; Cotton et al, 2023).

Simultaneously, the use of any technology needs to take into account all their ethical implications and how to use them responsibly (Sánchez-Ruiz et al., 2023; Graf and Bernardi, 2023; Gilat and Cole, 2023; Rudolph et al., 2023). Therefore, there is a debate on the benefits as well as the multiple risks, this technology could have in society. Many international organisations and governmental bodies, conscious of the unknown multiple implications AI will have, have been drafting reports to start regulating it (United Nations, 2023; European Parliament, 2023). Grassroots organisations and businesses have equally raised their voices. For instance, All Tech is Human, a global organisation of technologists, elaborated a guide on the complexity of the interaction of technology and societal issues (All Tech Is Human, 2023). Equally, the Center for Humane Technology (Summit, 2023) drew attention to the need to carefully deploy this technology in our society and be cautious of the problems it may originate. As a matter of fact, the use of language and hacking into how humans use it, is a way of "hacking into humanity" (Aza Raskin in Summit, 2023). Similarly, there have been open letters (Future of Life Institute, 2023) and public statements (Center for AI Safety, 2023), both signed by thousands of petitioners, requesting to consider the multiple risks involved in the use of this technology. Although the deployment of LLMs has spread into all aspects of society, this study will focus on its impact on education, where the whole learning process, assignments, search for information and writing has been shaken since the launch of the software.

The Bologna process presented a change from a teacher-centred model to a student-centred one, stressing the needs and pace of the students (Sánchez-Ruiz et al, 2023). The introduction of ChatGPT and other methodologies like blended learning, flipped teaching or game-based learning pretends to turn the learning process into an interactive, entertaining and stimulating process. The use of one or the other or their combination depends on the learning outcomes of the course. Because of the capabilities to generate content with the prompts and no intellectual effort, there is a chance that students resort to ChatGPT. Through its use the learning process decreases as much as the efficiency of the methodology employed by the teachers (Sánchez-Ruiz et al, 2023; Eke, 2023). The use of technology will always present challenges as much as opportunities, given the external factors involved in a situation. Similarly, the opinion on the use of AIs balances between accessible or restricted and legislated, where the EU has moved ahead of other countries (European Parliament, 2023) and made some early decisions on how to regulate AI.

In the area of education, in a post-pandemic world, the introduction of digital technologies as part of the learning process has equally triggered a series of consequences. There are opposing views on how to integrate the use of AI in a course (Crawford et al, 2023, Rudolph et at, 2023), but studies welcome both the threats and opportunities, ChatGPT presents (Farrokhnia et al, 2023). Teachers need to reach a balance of the integration of ChatGPT in their courses, including the possibility to integrate the technology as a way to encourage its proper, ethically-driven use (Crawford et al, 2023) as well as stressing a creative mindset among the students. The use of AI does not substitute learning and it

could be integrated along other software tools, like Grammarly (Crawford et al, 2023; Meyer et al, 2023). At the same time,

This study is set on the implications of ChatGPT for academic integrity and the reflection of students upon their own use of the software. This study recognises a gap in empirical data on the usage and impact of ChatGPT and similar AI tools in academic settings, so a comprehensive survey aimed at university students was designed. This survey serves as a critical tool to quantify and analyse the actual usage patterns, perceptions, and effects of AI technologies on the learning process across various disciplines at higher education. The subsequent methodology section details the survey design, including question formulation, dissemination strategies, and participant selection criteria. The answers obtained from this survey are thoroughly analysed in the results section, where the empirical data collected is presented. The conclusions provide an analysis of the impact of implementing ChatGPT in education, stressing the balance between technological innovation and academic integrity, bearing in mind the constant threats to integrity and the learning process (Rudolph et al, 2023).

Methodology

Survey Design and Dissemination

The survey was specifically designed to assess the impact and usage of GPT and AI technologies in educational settings. A comprehensive questionnaire consisting of 28 questions in Spanish was developed, focusing on various aspects of AI interaction and its influence in academic environments. The questions were a mix of open questions, Likert scale, and multiple-option types, ensuring a broad range of responses.

The questionnaire was distributed via Typeform, targeting university students in Spain from diverse academic disciplines. The survey was designed to be completely anonymously, prioritizing the privacy and confidentiality of the participants. No personal data was collected, adhering to ethical standards of research involving human subjects.

Data Collection and Initial Screening

The survey was conducted from February to July 2023, obtaining 1,895 responses. However, 523 responses were either incomplete or improperly answered, leading to their initial exclusion from the data analysis. Finally, a total of 1,372 completed surveys were gathered for the analysis. This screening ensured that the analysis was based on complete and correctly filled surveys.

Validation and Pilot Testing

Prior to the broad dissemination, the survey was pilot-tested with a small cohort of 42 students. This preliminary phase aimed to validate the findings and ensure the appropriateness of the questions. Furthermore, experts in statistics and social sciences were consulted to verify the survey's validity, adding credibility to both the survey design and the results it aimed to yield.

Demographic and Academic Profile of Respondents

With 1,372 valid responses, the sample showcases a gender distribution of 56.2% female and 43.8% male participants. The age composition is heavily centred around the traditional college age range of 18 to 22 years, with each group contributing approximately 17% of the total responses, which reflects the primary demographic of university students.

Furthermore, the study spans across 22 fields of study, including both STEM (Science, Technology, Engineering, and Mathematics) and non-STEM disciplines, with similar participation percentages across each field (see Fig. 1). The fields with the smallest percentages correlate with university degrees that traditionally see lower enrolment numbers. This distribution is important to note as it may introduce limitations to the study, suggesting that the findings are more reflective of certain disciplines over others. Figure 1 illustrates the percentages of participants from each field of study, providing a visual representation of the academic diversity within the sample.

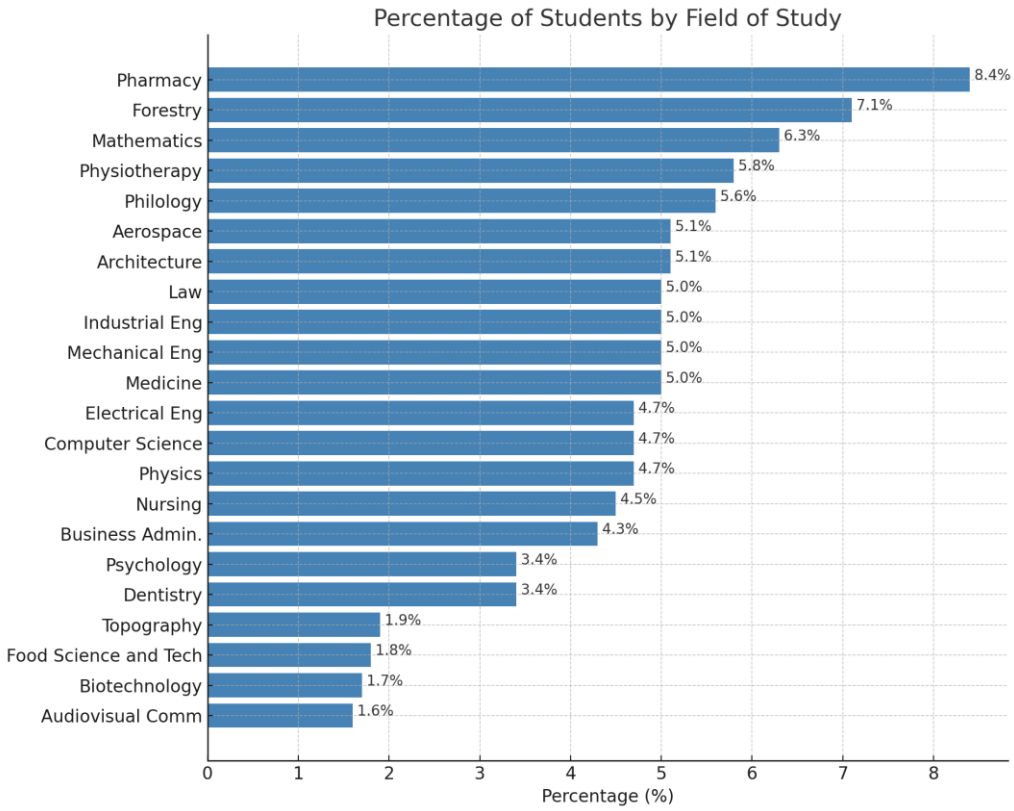

Figure 1. Percentage of students by field of study.

Ethical Considerations

Throughout the survey process, ethical considerations were rigorously maintained. The anonymity of the respondents was a key consideration, ensuring that their privacy was respected. The survey did not collect any personal data, and participants were made aware of the survey's purpose and the anonymity of their responses.

Results

This sectionpresents a detailed analysis of the responses gathered from the survey, which aimed to evaluate the use and impact of GPT and AI in educational contexts. The data, collected from a diverse group of university students, offers critical insights into how these technologies are integrated into academic and personal spheres. This analysis aims at highlighting key trends, preferences, and perceptions among students regarding AI tools like ChatGPT, providing a clearer understanding of their role in modern education. This section is pivotal in interpreting the data to inform future educational strategies and technological advancements in learning environments.

Self-perception of technological proficiency

One of the initial questions in the questionnaire, aimed at contextualizing the responses of students, was "How would you describe your level of technical knowledge in technology and AI?" This was measured using a Likert scale ranging from 1 to 5, where 1 represented 'Very Low', 2 indicated 'Low', 3 signified 'Moderate', 4 denotes 'High', and 5 corresponds to 'Very High' technical knowledge. .These results yield insightful data on university students' self-perception of their technological proficiency across various fields of study. The overall distribution of technological proficiency levels further highlights a general trend towards higher proficiency among university students, with most respondents rating themselves at levels 3 (32.1%), 4 (34.6%), and 5 (26.7%). This trend suggests an overall high level of comfort and confidence with technology and AI tools among the student population.

When considering students' fields of study, statistically significant differences (Kruskal-Wallis, p-value = 0.001) in their perceptions can be observed. The findings indicate that students in engineering and technology-related fields, such as Biotechnology, Computer Science, and Mechanical Engineering, tend to rate their technological skills higher (see Fig. 2). This suggests a correlation between the nature of the academic discipline and the self-assessed proficiency in technology. Interestingly, fields traditionally less associated with technology, such as Law and Philology, exhibited lower median scores, reflecting a more conservative self-assessment of technological skills. This variation across disciplines underscores the diverse nature of technological engagement and confidence among students.

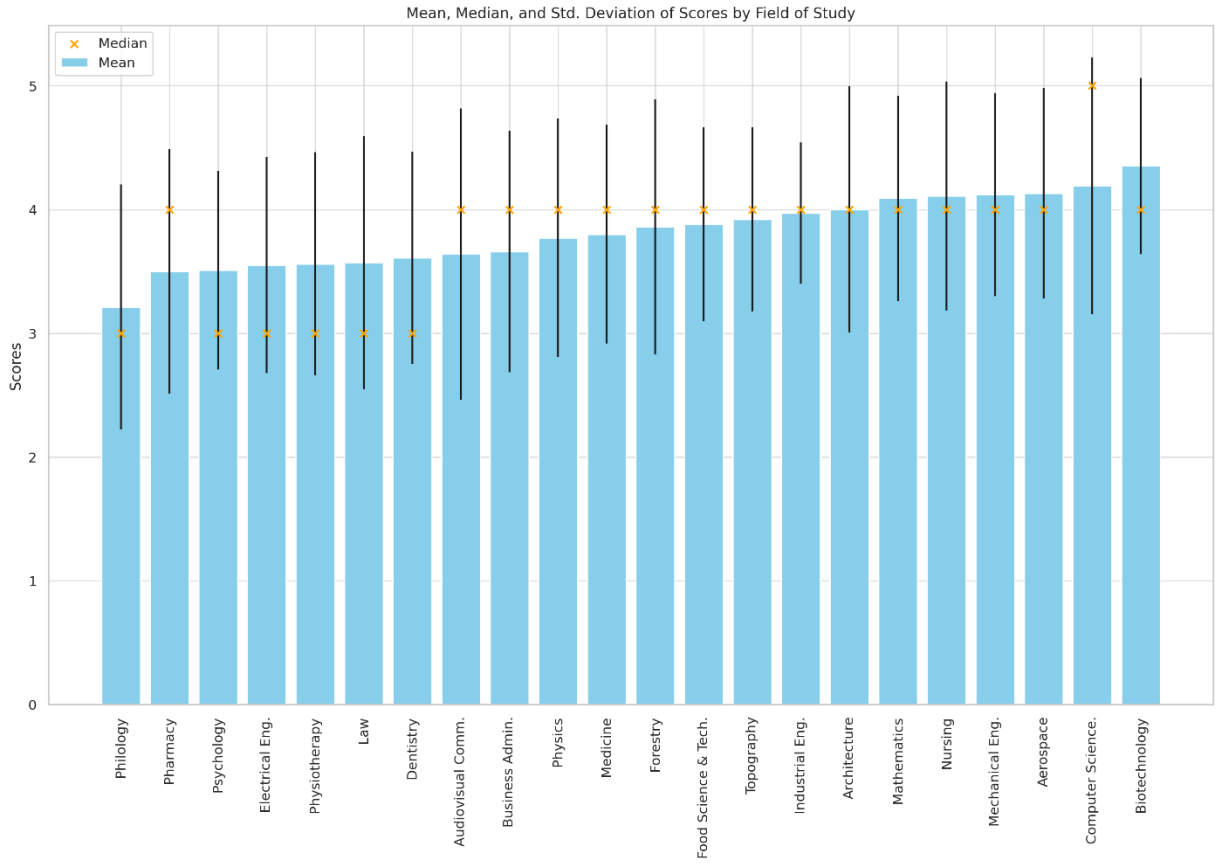

Figure 2. Self-perception of technological proficiency among university students across various fields of study.

This section underscores a significant trend of high self-perception of technological proficiency among university students, especially in fields closely associated with technology. These findings seem to reveal a strong correlation between students' academic disciplines and their self-assessed technological skills, probably indicating a diverse landscape of technological engagement and confidence. This insight can be crucial in understanding how different student groups might interact with and benefit from AI tools in their academic pursuits. The evident comfort and confidence with technology among most students set the stage for examining the adoption of GPT and AI in academia, which is explored in the next section.

Adoption of GPT and AI in Academia

All 1,372 university students surveyed reported using AI tools like GPT in their studies, signifying AI's pervasive role in education today. These technologies are increasingly becoming integral to the learning process, aiding in research, writing, and concept comprehension. This shift prompts critical discussions on academic integrity and the need for a balanced educational approach. Educators need to guide ethical AI usage while preparing students for a future where AI is integral to academia and professional life.

General use of ChatGPT or other AI

Having established the widespread use of AI and GPT tools among students, this section delves into their responses to the question: "How often do you use ChatGPT (or other AI) in an academic context (in general)?" As with previous questions, this was measured using a Likert scale ranging from 1 to 5. In this context, 1 signified 'Never', 2 indicated 'Rarely', 3 denoted 'Occasionally', 4 represented 'Frequently', and 5 corresponded to 'Always'. This question aims to illuminate how frequently students engage with these tools. Initially, an overall perspective is provided, not considering the field of study. Subsequently, the focus shifts to the significant differences in usage frequency across various disciplines.

The provided data reveals a moderate self-perceived usage of AI tools among students, with 43.9% indicating an average frequency. Additionally, 28.4% of the students report fairly regular use of these tools. At the extremes, we observe that 19.8% of students use these tools very frequently, while only 8% seldom or rarely use them. These findings suggest that the general adoption of AI tools in academia has become a widespread practice in students' daily academic activities.

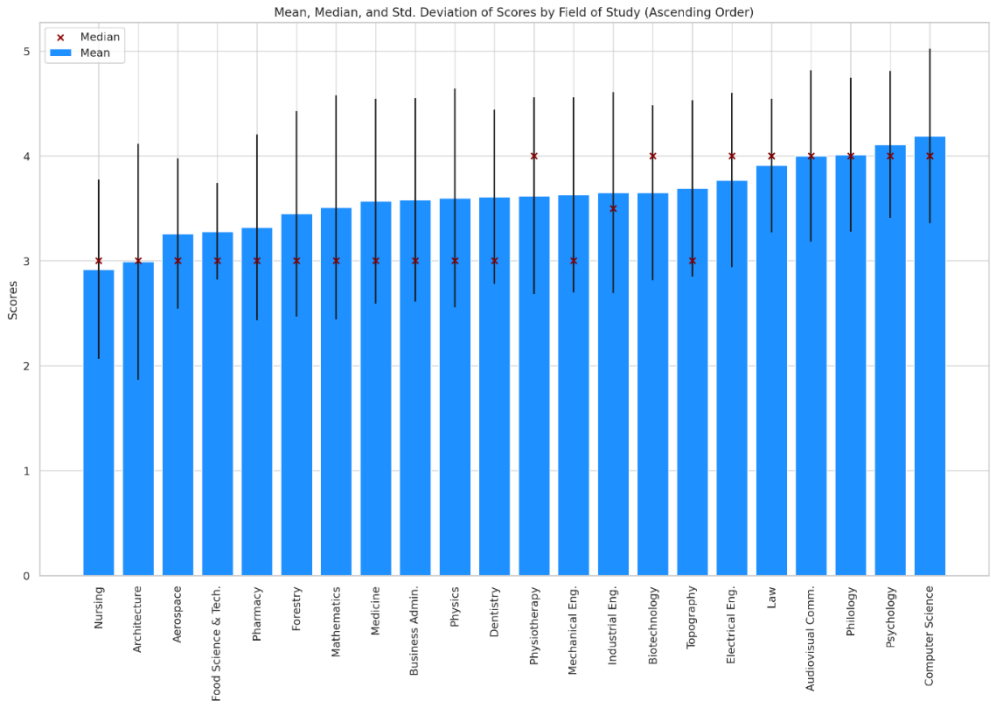

Figure 3. ChatGPT and AI tool usage across various academic disciplines.

The analysis of ChatGPT and AI tool usage across various academic disciplines, as detailed in Figure 3, reveals notable differences (Kruskal-Wallis, p-value = 0.002) in the application of these technologies. Disciplines such as Audiovisual Communication, Philology, and Psychology display higher mean values, indicating a more frequent use of AI tools. This trend can be attributed to the reliance of these fields on language processing and data analysis, where AI tools like ChatGPT excel. In contrast, disciplines like Architecture, Nursing, and Food Science and Technology show lower mean scores, suggesting infrequent usage. This pattern extends, generally, to fields more closely related to STEM. The less frequent use in these areas could be due to a greater emphasis on practical, hands-on training or a dependency on calculus and mathematical problem-solving, areas where AI tools are not yet fully proficient. However, Computer Science shows a notably high usage, possibly be due to familiarity with the AI environment and the fact that such tools are quite efficient in programming code in various languages, and versatile in correcting code once implemented.

The diversity in AI tool usage among different disciplines reflects the unique characteristics of each field, including those in STEM, and the varying degrees of technological integration in their curricula. It also underscores the disparities in awareness and accessibility of these tools among students.

General Frequency of ChatGPT Usage out-of-the-classroom

The focus in this section shifts to responses provided to the question, "How frequently do you use ChatGPT for tasks and activities at home?" (Likert scale, 1-5). This enquiry aims to capture the use of the tool by students, specifically for completing tasks and activities outside the classroom. The relevance of this question stems from potential access limitations within the classroom environment, contrasted with the likelihood of freer usage outside of it, as long as they have access to technology. General results indicate a significant utilization of these AI tools outside the classroom, with a notable percentage of students selecting options indicating frequent (34%), quite frequent (32.1%), and very

frequent (11.4%) use. This is set against a backdrop of a smaller proportion of students who seldom (6.3%) or infrequently (16.3%) engage with these tools.

When the field of study is considered, statistically significant differences (Kruskal-Wallis, p-value = 0.01) emerge again among student responses. Variations are evident in the descriptive statistics for each field, revealing disparities in mean usage levels of AI for academic tasks at home. Fields such as Law, Audiovisual Communication, and Computer Science are observed to have a higher tendency towards using ChatGPT or other AI tools for assignments (see Fig. 4), potentially due to coursework characteristics more amenable to AI support. Conversely, areas like Aerospace and Industrial Engineering demonstrate lower usage rates, possibly reflecting curricula less aligned with AI-compatible tasks, including the complexities of calculations.

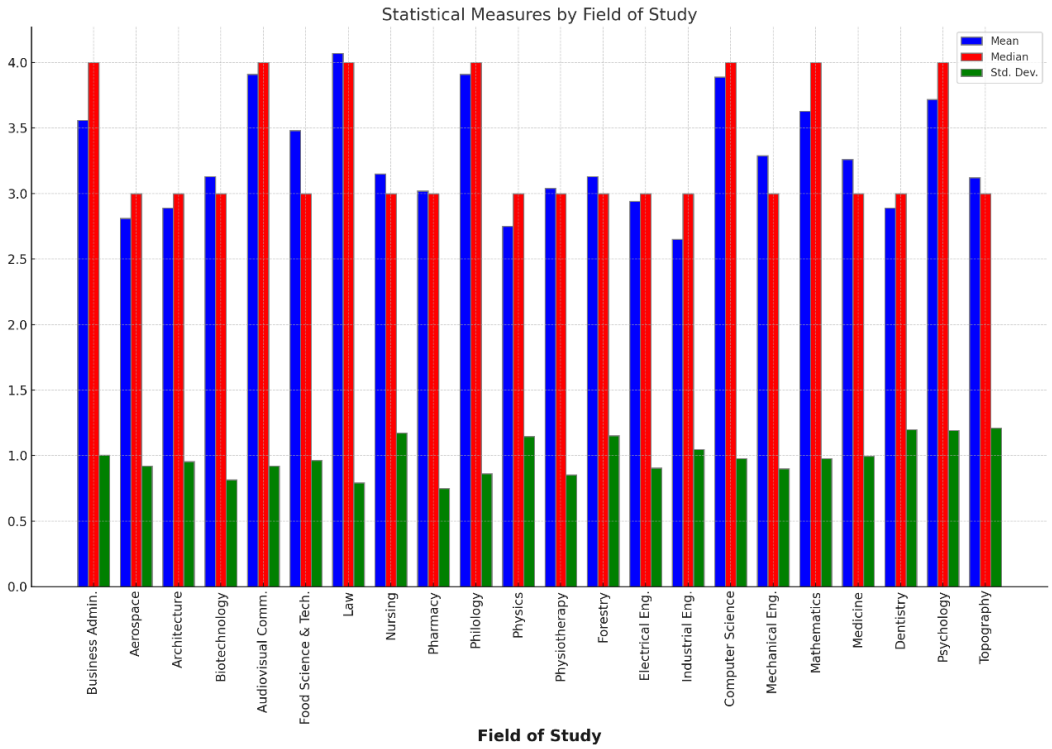

Figure 4. General Frequency of ChatGPT Usage out-of-the-classroom.

AI usage in different fields

The provided answers offer a revealing glimpse into the varied applications of AI and GPT models in academic settings. Information Search emerges as the predominant use, with a significant 82.5% utilization rate, underscoring the reliance on AI for data retrieval and knowledge acquisition. Academic Assistance follows at 57.2%, reflecting the increasingly substantial role AI seems to play in supporting educational activities and learning processes. Text Translation and Text Composition are utilized at 44.8% and 33.5% respectively, indicating a strong dependency on AI for language-related tasks, be it in translating academic materials or aiding in the composition of texts.

Entertainment, although not a core academic activity, still shows notable usage at 20.3%, perhaps signifying the integration of AI in other engaging and interactive forms of learning. The use of AI for

Email Response is relatively lower at 8.2%, suggesting a more limited application in managing academic communications. Exams and Programming, with respective usage rates of 40.2% and 24.4%, point toward the growing importance of AI in evaluating academic performance and in the increasingly vital field of computer science education. These statistics collectively highlight the diverse and significant impact of AI and GPT models in the academic landscape.

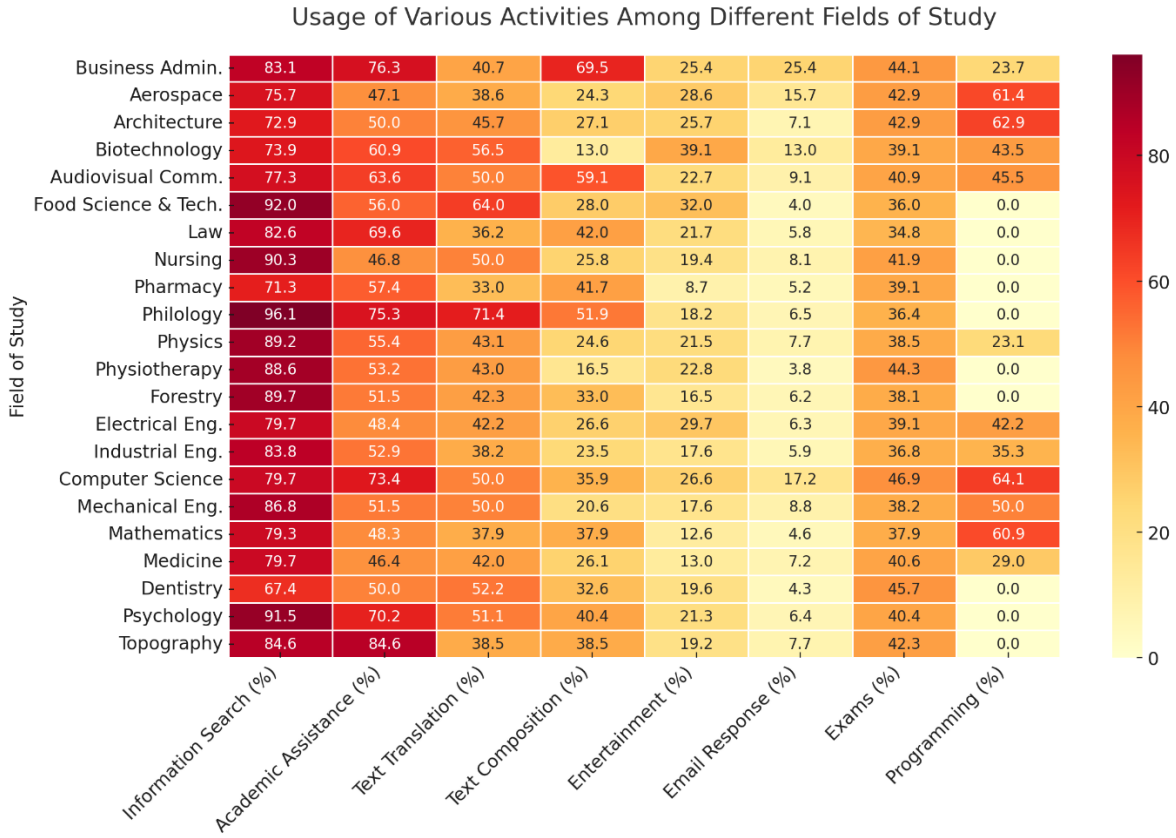

Figure 5. Uses of AI and GPT in academic tasks.

When considering the field of study, the data provides insightful observations regarding the reliance of students from different fields of study on AI-enabled resources and tools. In activities such as Information Search, Academic Assistance, and Text Translation, fields like Philology, Food Science and Technology, Psychology, and Biotechnology show high engagement levels (see Figure 5). These high percentages suggest a significant reliance on AI-driven search engines, academic databases, and language translation tools, reflecting the apparent integral role of AI in facilitating research and academic endeavours. Similarly, high engagement in Text Composition in Business Administration and Audiovisual Communication indicates the use of AI tools for tasks like automated grammar checking and content generation. Meanwhile, the moderate use of Entertainment and Email Response across various fields implies the utilization of AI for recreational and communication purposes, albeit to a lesser extent.

In contrast, the Programming activity highlights a more direct interaction with AI and technology, particularly in fields like Computer Science, Electrical Engineering, Mathematics, and Mechanical Engineering, where the percentages are notably high. This trend underscores the importance of programming skills in these technical domains. As expected, the negligible or non-existent engagement in Programming in fields such as Law, Nursing, Pharmacy, and Psychology indicates a different form of dependency on AI. This differential reliance on AI underscores the diverse ways in

which AI permeates various academic disciplines, shaping the nature and extent of its integration into the educational and research processes.

Digital Tool Preferences to specific questions

The responses to the survey question, "When trying to understand a specific topic in your studies, assuming the information is available on ChatGPT and other resources, which tool would you employ first?" provide crucial insights into student preferences in academic research. It is essential to study these responses as they offer a clear perspective on the circumstances under which AI is favored in the academic context, especially when compared with other traditional information sources. This understanding not only sheds light on the growing influence of AI in education but also helps in assessing its perceived effectiveness and reliability among students from various academic disciplines.

The survey data highlight the varying preferences of university students for digital tools when addressing specific academic questions, illustrating the diverse landscape of digital resource utilization in academic settings. The figures reveal a considerable reliance on AI: 81.3% of students in Computer Science and 70.2% in Psychology prefer using AI tools like ChatGPT as their go-to specific resource (see Fig. 6). Conversely, Google is favored by 45.7% of Dentistry students and 38.5% in Topography, showcasing its continued prominence in research-heavy fields. Moreover, the data show that students in Philology and Physics prefer Wikipedia, with respective percentages of 5.2% and 3.1%, which, while not the majority, indicates its value for initial research stages in these disciplines. Video content on YouTube is notably preferred by 33.9% in Business Administration and 42.9% in Architecture, suggesting the utility of visual and auditory learning in these fields. Educational Websites have a substantial impact on Biotechnology studies, where 26.1% of students use them as their primary resource, pointing towards the specialized nature of their enquiries.

In the overarching digital ecosystem, AI tools have established a significant presence, with a collective usage rate of 41.4% among students seeking academic information, indicating a strong trend toward AI reliance. Google, as a veteran in the realm of digital resources, still commands a substantial share of 24.9%. Meanwhile, other digital resources like YouTube and Educational Websites maintain considerable usage at 17.6% and 11.5%, respectively. Wikipedia, although used less frequently with a usage rate of 3.7%, and Social Media at a marginal 0.8%, seems to play a non-significant role in the academic research toolkit.

These data underscore that while AI's ascendancy in the academic domain is noteworthy, there is a coexistence with and continued relevance of other digital resources. The integration of AI does not overshadow the utility of traditional digital platforms but rather seems to complement them, creating a diverse and symbiotic digital environment for students.

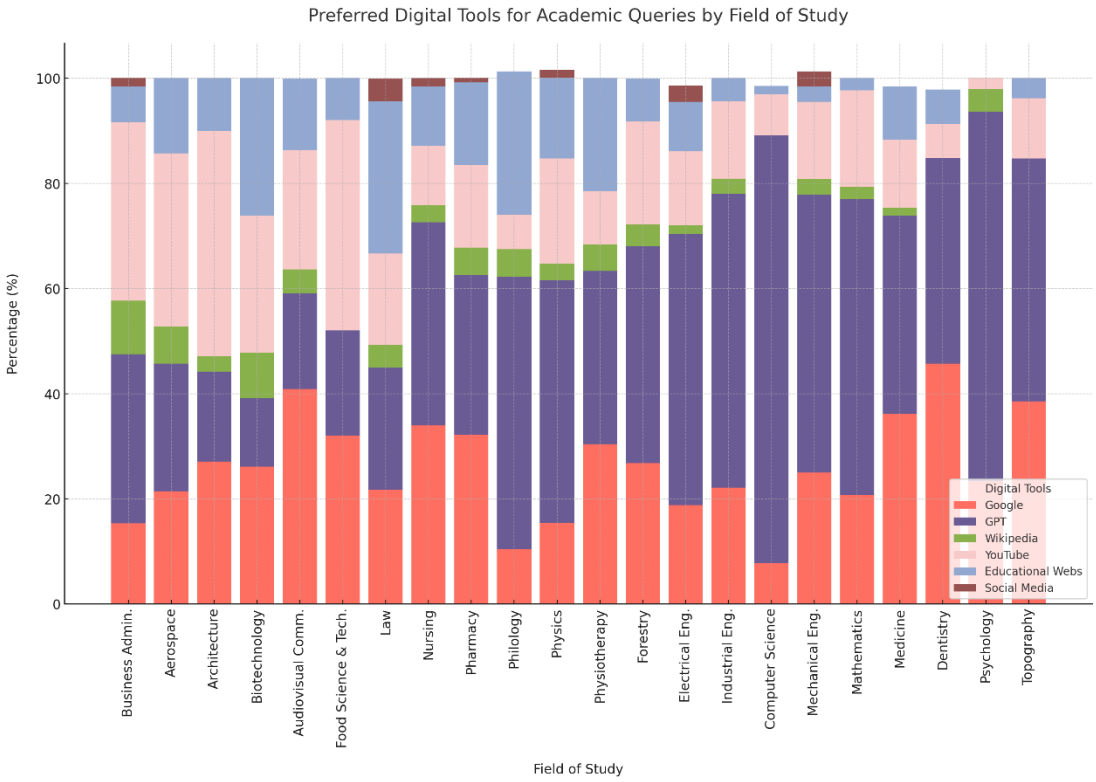

Figure 6. Digital Tool Preferences to specific questions.

This section has provided an initial analysis of the adoption and application of AI and GPT tools in academic settings, as reported by a diverse group of university students. The findings from the survey may indicate a substantial engagement with AI tools in various academic contexts, reflecting their growing presence in education. The observed patterns of AI tool usage, both within and beyond the classroom, suggest varying degrees of reliance across different disciplines. This variation may point to the distinct needs and technological incorporation within each academic field.

The investigation into students' preferences for digital tools when seeking academic information reveals a trend toward the utilization of AI resources. However, the data also indicates the persistence of traditional digital platforms such as Google, YouTube, and Educational Websites, suggesting a multifaceted digital landscape in academia. The presence of AI tools alongside these traditional resources may denote a complementary relationship, contributing to a diverse educational ecosystem.

In the next section, we will discuss the potential role of AI technologies in facilitating the learning process, when dealing with new topics, to provide insights into their implications for educational practices and student experiences.

Learning new topics

The preferences of university students in accessing information for understanding a specific topic within their studies, assuming availability through both ChatGPT and other resources, have been the subject of this research. Survey data reveal a shift toward AI-driven tools like ChatGPT, despite the continued importance of specialized forums and traditional books. In the field of Psychology, 68.1% of students prefer AI tools, and in Informatics, the percentage is 59.4% (see Fig. 7). Yet, traditional books maintain a strong presence, especially in Medicine and Architecture, where they are the initial resource of choice for more than a third of students.

The move toward digital and AI resources indicates a significant shift in educational paradigms, reflecting changes in student engagement with information. Interactive and conversational AI tools are sought after for their immediacy and user-friendly interfaces, yet the sustained use of traditional resources points to their role as complementary to AI technologies. This situation necessitates that educational institutions maintain a balance, integrating AI tools while still valuing traditional academic resources to support a comprehensive educational framework.

Looking at the overall preferences for educational tools, books, whether digital or print, continue to be fundamental, chosen by 19.1% of participants. Educational websites and platforms, such as EdX and Coursera, are less common, and preferred by only 1.7%. Specialized forums are favored by 14.0% of students, highlighting the value placed on collaborative knowledge exchange. Nonetheless, AI platforms, particularly ChatGPT, have emerged as the dominant resource with 38.6% of students using them, surpassing YouTube, which holds a significant but lesser share of 26.6%.

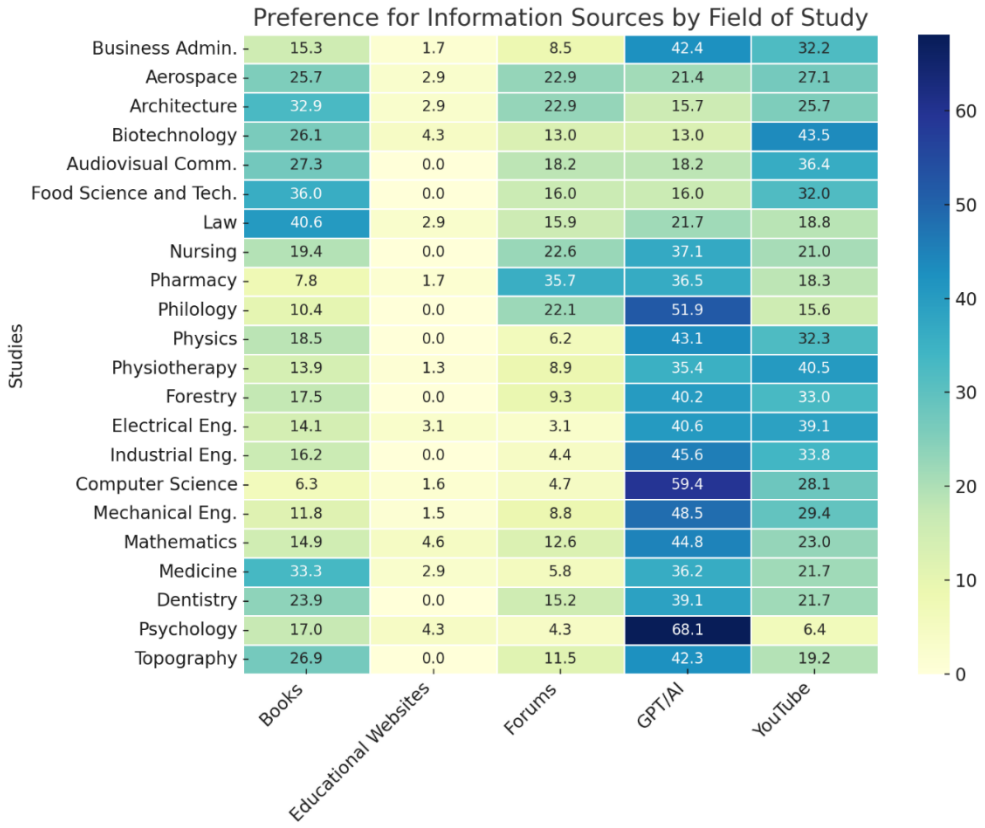

Figure 7. Preferences for information on new topics.

The data seems to indicate a trend towards AI tools like ChatGPT for learning new topics among university students, while also revealing the sustained importance of traditional resources. This blend of AI and traditional education methods reflects the diverse learning preferences observed in previous sections, mirroring the evolving landscape of academic resource utilization.

In AI we trust

In examining the pivotal issue of trust in responses from artificial intelligence platforms such as ChatGPT, it is necessary to consider the significant impact this has on educational paradigms. Confidence in AI is believed to be based on three pillars: the accuracy and truthfulness of the answers, digital security in the handling and transfer of data, which includes the data policy of companies, and

in some way, the acceptance that these types of technologies have when adapting them to our day-to-day lives. In this paragraph, two of these questions will be evaluated: the accuracy in the responses assessed by the students, which contributes a considerable limitation to the study, and data protection.

On the one hand, the answers obtained from the survey provide a detailed picture of the level of trust students place in the answers provided by artificial intelligence across a spectrum of academic disciplines.

The answers indicate a stratified level of trust in AI among university students, with only 4.9% expressing the lowest level of trust (score of 1) and 4.7% exhibiting the highest trust (score of 5). The bulk of responses cluster around the mid-range (scores of 3 and 4), with 40.3% of students reporting a neutral stance and 26.2% leaning more towards trust. This distribution suggests a moderate level of confidence in AI-generated answers among the student population.

Considering the field of study, there exist statistically significant differences among the levels of trust (Kruskal-Wallis, p-value = 0.002). Disciplines like Business Administration, Aerospace, and Architecture reflect a mean trust level of approximately 3, indicating a balanced skepticism and acceptance of AI capabilities (see Fig. 8). In contrast, fields such as Communication and Psychology exhibit a higher mean trust level, at 3.32 and 3.60 respectively (Fig. 8), likely due to a higher success rate in responding to topics or questions related to these areas of study.

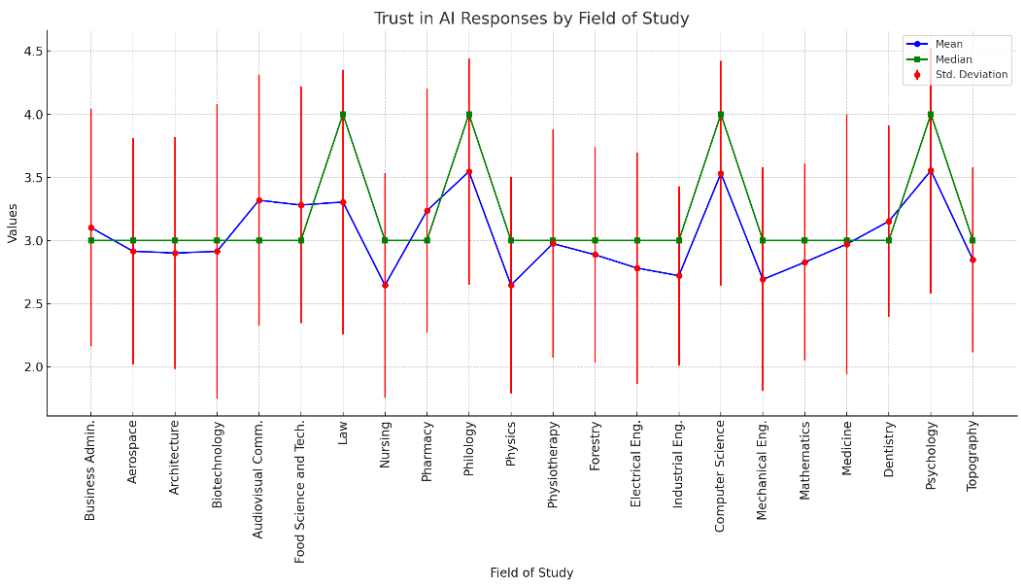

Figure 8. Trust level in AI responses by field of study. Mean, median and standard deviation are shown.

This variation highlights the diverse expectations and experiences with AI, influenced by the nature of each discipline. STEM fields, in particular, present a unique context. There is an observed reticence in these areas, potentially due to AI's nascent and sometimes imperfect handling of complex calculations, which are central to these disciplines. Mathematical problems and models often reveal the limitations of AI, leading to a perception of fallibility in numerical reasoning among students. Computer Science stands out as an exception, possibly due to AI's allegedly robust performance in programming-related tasks, which aligns closely with the curriculum.

The underlying trend across the survey is cautious optimism about the accuracy of AI, with a clear acknowledgment of its growing role in educational settings. However, the data also call for a measured approach to incorporating AI into learning environments, ensuring that trust is built on a foundation of proven reliability and complementarity to traditional educational resources.

Figure 8. Trust level in AI responses by field of study. Mean, median and standard deviation are shown.

Despite the data occasionally reflecting a moderate level of trust in the responses provided by ChatGPT, the aspect of data protection reveals a different trend: 70% of users have not taken any specific measures to protect their data, while only 30% have implemented some form of protection. Among the measures taken, the most notable include limiting the sharing of personal information (15%), creating separate email accounts for interactions (8%), avoiding public networks (10%), using incognito browsing windows (5%), and using a VPN (3%). Interestingly, only 1% adjusted their privacy settings, and a significant portion reported deleting their chat history after interacting with GPT, though the effectiveness of this method in ensuring data privacy remains to be fully assessed.

These responses predominantly come from students in the field of Computer Science, which is understandable given their deeper knowledge and heightened awareness of the vulnerabilities in data exchange. Similarly, technical fields also show a higher tendency to adopt these measures, likely for the same reasons. Law students exhibit a moderate use of privacy protection measures, possibly due to the nature of their studies which emphasize the importance of confidentiality and privacy.

The findings from the survey seem to reveal a moderate level of trust in AI among students, showing a tendency towards cautious optimism. Trust varies significantly across disciplines, reflecting the distinct expectations and experiences with AI in each field. Additionally, the insights on data protection practices indicate a notable gap in proactive measures among students, suggesting a need for increased education and awareness, particularly in non-technical disciplines.

In the next section, we will explore how students perceive the benefits of AI tools in enhancing their educational experiences.

Student Perspectives on the Positive Impact of ChatGPT in Learning

The integration of ChatGPT and similar AI tools into educational settings has sparked a considerable debate about their potential to influence student learning (Cotton et al, 2023; Farrokhnia et al, 2023). Understanding student perceptions of ChatGPT's impact can help inform about the acceptance level of such technologies in academia and their expected utility in enhancing the educational experience. This section focuses on the analysis of students' opinions regarding the positive impact of ChatGPT on their learning experience.

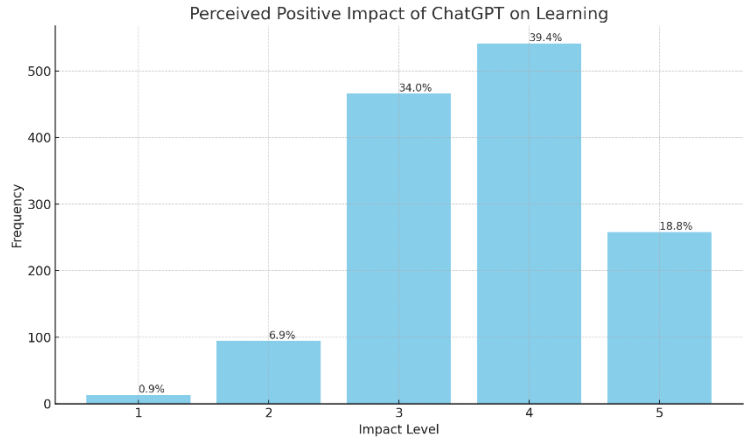

Figure 9. Perceived Positive Impact of ChatGPT in Learning.

Student responses to the survey question regarding the positive impact of ChatGPT on their learning reveal a spectrum of opinions, with responses ranging from minimal to significant impact. Overall, a considerable majority of the students (57.2%) scored their belief in the positive impact of ChatGPT as high, indicating scores of 4 and 5 (see Fig. 9). This perception is mirrored across various fields of study, with certain disciplines exhibiting a particularly strong conviction in the benefits of ChatGPT, such as Topography, Medicine, or Biotechnology, possibly due to the latest advances in the application of this technology in these fields. Indeed, the field of 'Topography' shows the highest mean score of 4.08, with a standard deviation of 0.796, indicating a strong consensus about the beneficial role of ChatGPT. Meanwhile, 'Aerospace' students exhibit a more moderate mean score of 3.49, with a higher standard deviation of 0.928, suggesting varied opinions on the matter.

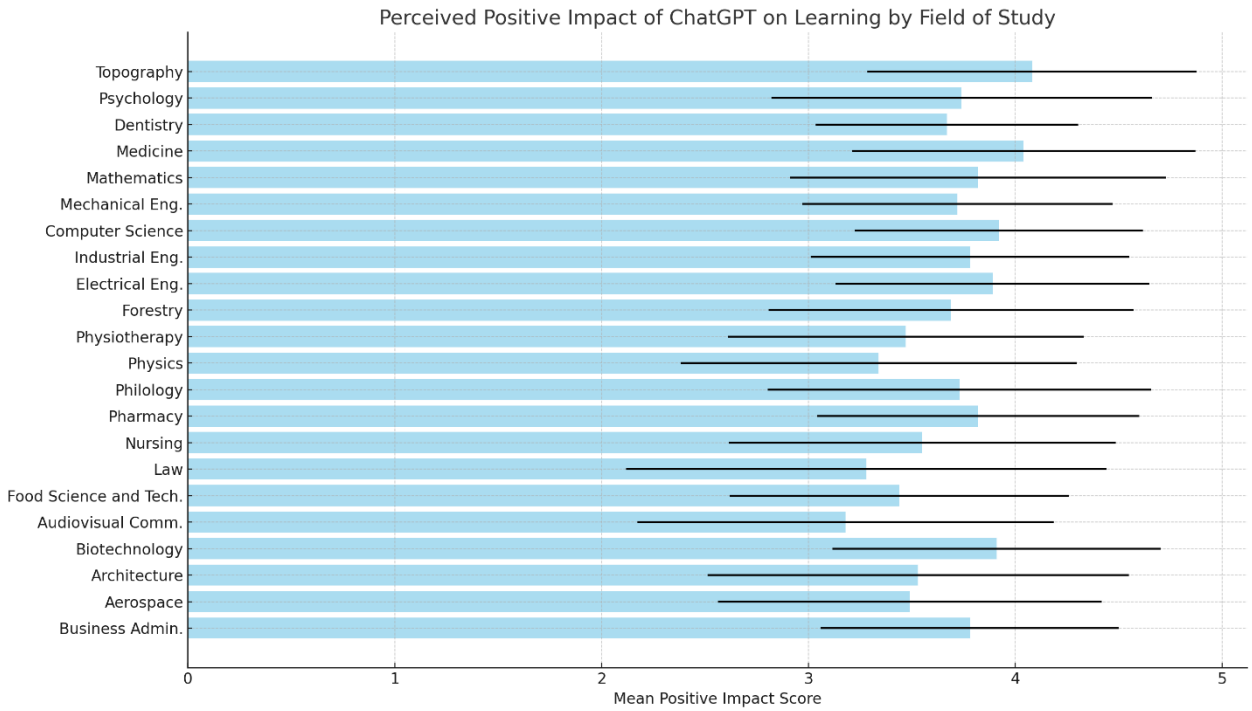

Figure 10. Perceived Positive Impact of ChatGPT in Learning by Field of Study.

The responses to the question about the positive impact of ChatGPT on education indicate a generally positive outlook on its role in educational contexts, with significant variations across disciplines (Kruskal-Wallis, p-value = 0.01). The higher levels of perceived positive impact in fields like 'Topography', 'Informatics', and 'Medicine' (see Fig. 10) could reflect the effectiveness of ChatGPT in handling specialized information or aiding in complex problem-solving scenarios common to these studies. Conversely, the lower mean scores in fields such as 'Aerospace' and 'Communication' could stem from a perceived lack of precision or relevance of ChatGPT's current capabilities in these areas.

The overwhelmingly positive response in the higher end of the scale underscores the growing acceptance and potential reliance on AI tools like ChatGPT to supplement traditional educational resources. It suggests a shift towards embracing AI as a collaborative tool that can offer substantial support in the learning process. However, the variation across fields of study highlights the need for a contextual approach to the integration of AI in education, ensuring that it meets the distinct needs and expectations of each discipline.

The survey responses reveal a generally positive perception among students about the impact of AI tools on their learning, with many recognizing its potential benefits. The differences observed across academic disciplines suggest that the perceived effectiveness varies depending on the field's nature and requirements. This variation in responses may indicate the diverse ways students across various fields interact with and perceive AI tools. Moving to the next section, we will investigate how students perceive the impact of AI tools like ChatGPT on their academic performance, shedding light on the potential outcomes of AI usage in educational settings.

Influence of ChatGPT on Student Grades

This section focuses on evaluating the perceived impact of ChatGPT on students' academic performance, particularly regarding their grades in activities and assignments. The use of AI-driven tools like ChatGPT in academic settings has raised questions about their influence on learning outcomes. To this end, the survey aims to understand students' perceptions on whether ChatGPT has affected their grades.

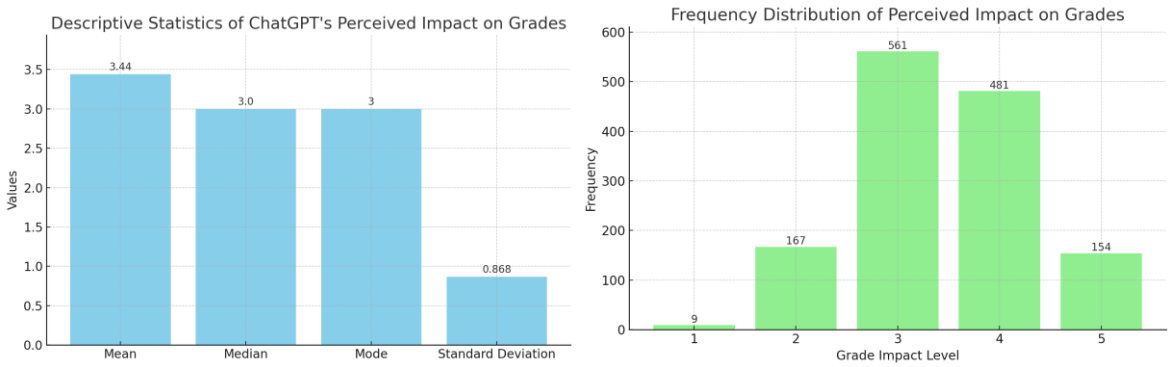

Figure 11. In the graph on the left, the statistical values (mean, median, mode, and standard deviation) of the overall values of the sample are presented, that is, considering all the data from the sample, regardless of the field of study. In the graph on the right, the frequency of each of the options for the question is shown.

The analysis of student responses regarding the impact of ChatGPT on their homework and activity grades indicates a general tendency perception towards a moderate to positive impact of ChatGPT, with a mean response of 3.44 (see Fig. 11, left picture). The mode and median, both at 3, suggest that

the most common perception among students is a neutral impact. However, a substantial proportion of respondents (46.3%) perceive ChatGPT as having a positive influence (scores of 4 and 5), indicating a noteworthy reliance on AI tools for academic assistance (see Fig. 11, right picture). These findings suggest that while a significant number of students feel that AI tools like ChatGPT positively influence their academic performance, there remains a considerable portion who view its impact as neutral. This could reflect varying levels of usage, reliance on, and trust in AI tools across different student groups.

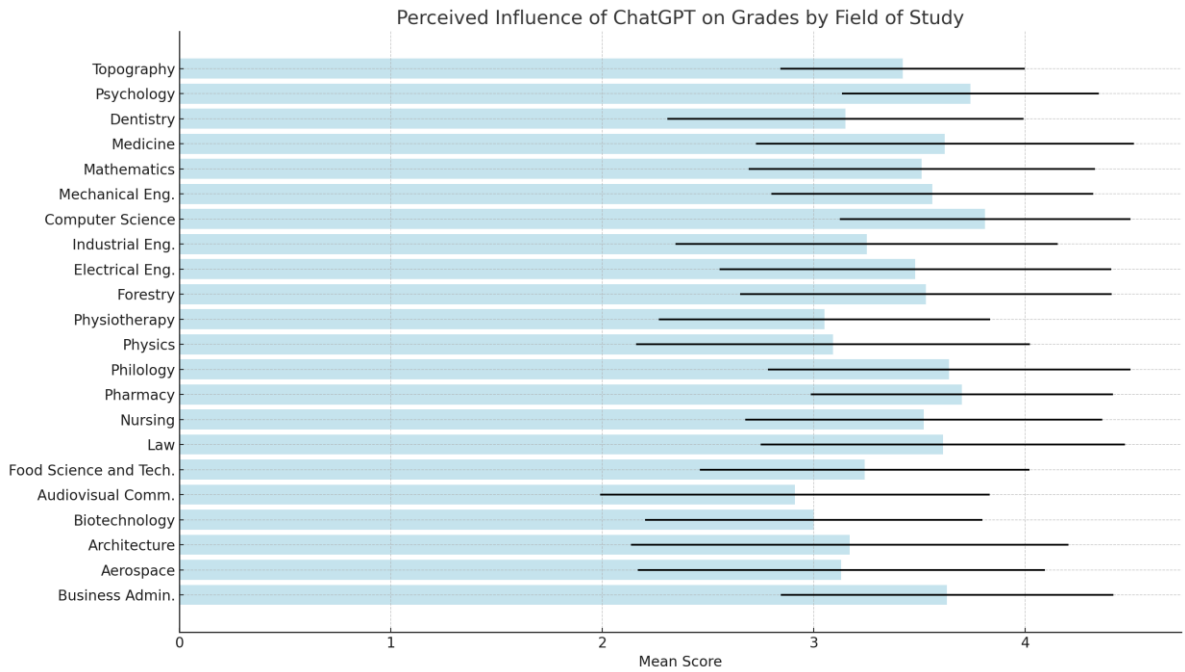

Figure 12. Perceived influence of ChatGPT and other AI tools on the grades in activities and assignments. The graph includes the mean (in blue), and standard deviation (in black).

When considering the field of study, the perceived influence of ChatGPT on grades across various fields of study shows statistical differences (Kruskal-Wallis, p-value = 0.02) (see Fig. 12). This variation might be influenced by the nature of the coursework, the extent to which AI tools can assist in those areas, and students' personal preferences in using such technology for academic purposes. It can be seen in Fig. 12 that the mean scores vary, with some disciplines showing a higher reliance on ChatGPT for academic performance. For instance, Computer Science and Medicine students report a higher mean score, suggesting a more significant perceived impact of ChatGPT on their grades. Conversely, fields like Biotechnology and Audiovisual Communication show lower mean scores, indicating less perceived influence of ChatGPT on their academic outcomes.

In brief, the survey findings indicate a general perception among students of a moderate to positive impact of GPT or AI tools on their academic performance, particularly in terms of grades. While the most common view is of a neutral impact, a considerable proportion of students perceive a positive influence on their grades. The variation in perceived impact across different fields of study may reflect the diverse applications of AI tools in various academic contexts and the varying degrees of reliance on these technologies. In the next section, the focus will shift to exploring students' views on the ethical dimensions of using AI tools like ChatGPT in their academic work, an area of growing importance in the current educational landscape.

Perceptions of Academic Integrity in the Age of AI

In an era where artificial intelligence (AI) tools like ChatGPT are increasingly accessible, a pivotal question emerges: How do students perceive the impact of these tools on academic honesty? This subsection delves into the perceptions across various academic disciplines, exploring whether students believe the use of AI could potentially encourage academic dishonesty or cheating. The analysis of these answers offers insights into the ethical considerations that AI tools bring to the forefront in educational settings.

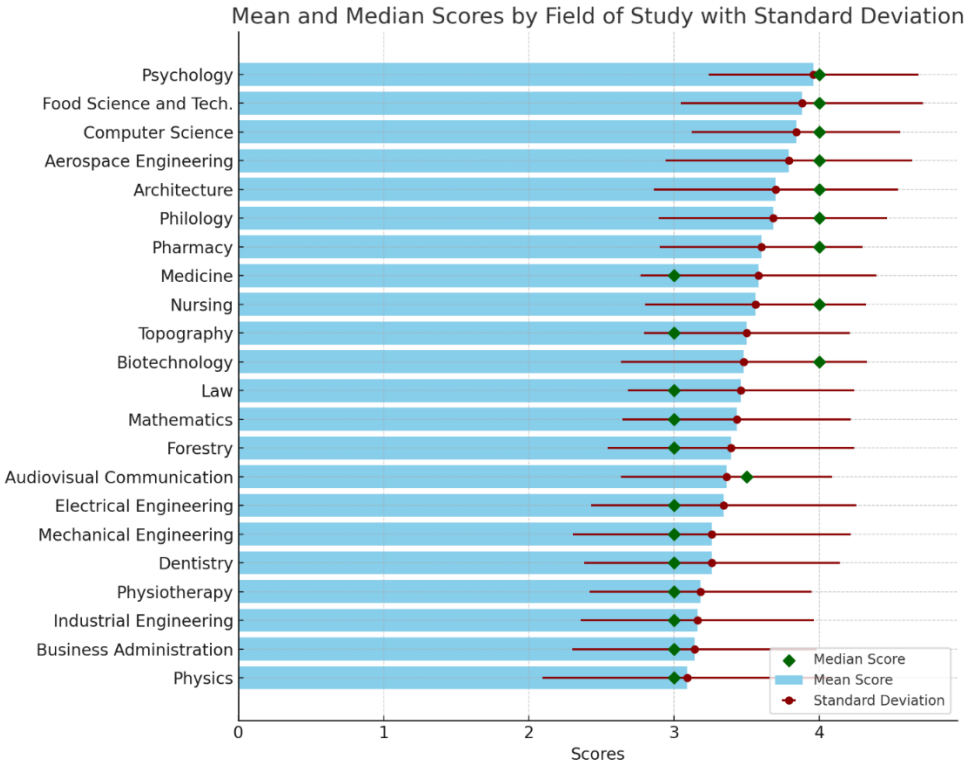

Figure 13. Mean (blue), median (green), and standard deviation (black) scores by field of study.

The answers reveal a spectrum of perceptions regarding AI's potential to foster academic dishonesty. Fields like Psychology and Food Science exhibit a relatively higher concern (mean scores above 3.5), suggesting a heightened awareness or perhaps a more stringent view of AI's role in academic integrity (see Fig. 13). Contrastingly, areas like Physics and Physiotherapy present lower mean scores, indicating a more moderate concern about AI-induced dishonesty. As before, this perception may be due to the performance of AI in different fields of study, since the more fallible it is in that field, the less concern there is about using this tool fraudulently. It also probably has to do with the type of evaluation used in that field of study, and whether this method provides clear options for using AI dishonestly.

Interestingly, the means are all above 3 and the median scores are frequently anchored at 3 or 4 (Fig. 13), implying that a significant portion of students, irrespective of their field, hold a balanced or slightly cautious view on this matter. The standard deviation across most fields suggests a diversity of opinions, reflecting the complex and nuanced nature of this issue.

The survey responses seem to indicate a varied spectrum of student perceptions regarding the impact of AI tools on academic integrity. Different academic disciplines exhibit diverse levels of concern, with some fields demonstrating heightened awareness about the potential of AI to foster academic dishonesty. The overall tendency towards a balanced or slightly cautious view across most fields reflects the complex ethical considerations that AI introduces into educational environments. These diverse opinions highlight the need for ongoing dialogue and policy development concerning AI's use in academia to ensure that it aligns with the principles of academic honesty.

Conclusions

The survey results offer a picture of the modern student's digital toolkit, revealing an intricate balance between traditional online resources and emerging AI technologies (Lim et al., 2023). The data depict a stratified landscape of digital reliance, with AI platforms, particularly ChatGPT, being a prominent choice for 43.9% of students (Farrokhnia et al., 2023). This notable inclination towards AI for academic enquiries suggests that students are not only becoming comfortable with but also trusting in the efficacy of AI to assist in their educational endeavours. Traditional resources such as Google still play a critical role, evident from its 24.9% usage, with students valuing its broad searching capabilities.

The high level of self-reported technological proficiency among students, particularly in technology and engineering fields, indicates a growing digital competence in the student population. This proficiency, however, is not uniform across all fields, reflecting varying levels of digital literacy that do not necessarily imply a need for AI integration strategies in all disciplines. Rather, this variation highlights the importance of acknowledging and respecting the unique digital landscapes inherent to different fields of study.

Moreover, trust in AI, as reflected in the survey, extends beyond mere reliance on the accuracy of the information. Only a minority of students displayed extreme trust or distrust, with 4.9% at the lowest trust level and 4.7% at the highest. The majority's trust levels hover around the midpoint, signalling a cautiously optimistic embrace of AI's potential in academia. The mean trust levels vary by discipline, with Aerospace and Architecture averaging around 3, suggesting a pragmatic view of AI's current capabilities. On the other hand, Communication and Psychology report higher trust levels, probably due to a combination of the high effectiveness of AI responses in these fields and an alignment between the capabilities of these technologies and the curriculum of these studies.

The optimistic view of AI's role is further supported by students' perceptions of ChatGPT's positive impact on their learning. A majority (57.2%) believe in the high positive influence of AI on their learning outcomes, with disciplines like Topography reporting a high mean score of 4.08 in this regard. This positive sentiment is reinforced by the perceived influence of ChatGPT on the grades in activities and assignments, where a substantial proportion of students (46.3%) acknowledge its beneficial impact, although the median response remains neutral. Such responses suggest an acknowledgment of AI's supportive role rather than a transformative one.

However, alongside the acknowledgment of AI's benefits, the survey brings to light concerns regarding academic integrity in the age of AI. These concerns are echoed in the literature (Cotton et al., 2023; Alser and Waisberg, 2023), where the challenges and opportunities of using AI tools like ChatGPT in higher education are discussed, particularly for academic honesty and plagiarism. Additionally, the need for ethical leadership in managing AI tools like ChatGPT in educational settings has been highlighted (Crawford, Cowling & Allen, 2023), recognizing the potential of these technologies to support deeper learning and better outcomes when used responsibly and ethically. This adds a layer of complexity to the debate on AI's role in education, emphasizing the need for stringent academic standards and ethical guidelines in AI usage. The mean scores across fields like Business Administration (3.14) and Aerospace Engineering (3.79) reflect a spectrum of attitudes toward the

implications of AI on academic honesty. Students seem to be grappling with the ethical boundaries of AI use, indicating the need for clear guidelines and educational policies that delineate responsible AI usage.

The discussion thus pivots around the dual themes of AI's integration into educational practices and the imperative of maintaining academic integrity (Sánchez-Ruiz et al., 2023). The data advocate for a balanced approach, where AI is harnessed to enhance the learning experience while upholding the principles of scholarly work. This balanced approach also calls for the development of critical evaluation competencies among students, enabling them to discern the credibility and relevance of AI-generated content effectively. As AI continues to evolve, its integration into educational settings should be carefully managed to foster a trustworthy and ethically conscious academic environment.

In conclusion, this study contributes to the understanding of the complex and multifaceted role of AI in modern education. The findings highlight the importance of considering the unique needs and characteristics of different academic disciplines when integrating AI technologies into educational practices. As the landscape of AI in education continues to evolve, a balanced and nuanced approach is required to harness the potential of these technologies while addressing the ethical, educational, and practical challenges they present.

Acknowledging the existing integration of AI tools in educational settings, future research should focus on effectively managing and optimizing the use of these technologies. This includes studying further the impact of AI on different aspects of education, such as student engagement, learning outcomes, and academic integrity. Investigating the long-term effects of AI on student performance and its role in shaping educational experiences can provide deeper insights. Additionally, research could explore the ethical dimensions of AI use in academia, particularly in maintaining academic honesty and addressing data privacy concerns. Evaluating the effectiveness of different strategies for promoting responsible AI use among students, and understanding the varying impacts of AI across different academic disciplines, are also critical areas.

Building on the aforementioned research directions, it is crucial to align these enquiries with comprehensive policy considerations. Future studies should inform the development of ethical guidelines for AI use in education, emphasizing the maintenance of academic integrity and the prevention of dishonest practices. Policies centred on safeguarding student data privacy are imperative, given the extensive data processing capabilities of AI tools. Additionally, research findings can guide the creation of policy frameworks that assist educators and institutions in effectively integrating AI into teaching methodologies, ensuring that AI complements rather than replaces essential cognitive skills.

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