

A blue and red robotic hand is shown reaching towards a human hand. The robotic hand is positioned above the human hand, with its fingers slightly curled. The human hand is positioned below it, with its fingers spread. The background is a solid light blue color.

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Chatbots and other AI for learning:

A survey of use and views among university students in Sweden

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Highlights from the study

- * 5,894 students from across Swedish universities were surveyed about their use of and attitudes towards AI for learning purposes, both about chatbots (such as ChatGPT) and other AI language tools (such as Grammarly).
- * 1,707 survey respondents offered individual comments, adding thoughts and reflections about the effective and ethical use of AI in higher education.
- * Overall, most students are positive towards the use of chatbots and other AI-language tools in education; many claim that AI makes them more effective as learners.
- * Almost all the respondents are familiar with ChatGPT (but typically not with other chatbots); more than a third use ChatGPT regularly. Students' knowledge and usage of other AI-language tools, particularly language translation tools, is widespread.
- * More than half of the respondents express concern about the impact of chatbots in future education; concerns about other types of AI-language tools are much less pronounced.
- * More than sixty percent believe that the use of chatbots during examination is cheating; this is not the case for other AI-language tools. However, a majority of students is against the prohibition of AI in education settings.
- * Most students do not know if their educational institutions have rules or guidelines regarding the responsible use of AI; one in four explicitly says that their institution lack such rules or guidelines.



The findings presented here provide valuable insights into students' engagement with AI in higher education and contribute to the rapidly growing body of research in this area.

From Concluding remarks

Introduction

Students in higher education lead their academic lives, and much of their ordinary lives, in an environment increasingly influenced by artificial intelligence (AI). In this regard, both Zawacki-Richter et al. (2019) and Holmes and Tuomi (2022) note, for example, how students engage with AI-based adaptive learning platforms enabling them to customize their learning experience according to needs, preferences, and learning style. Students also have access to AI-powered writing tools providing real-time feedback on grammar, spelling, punctuation, and style, or suggesting improvements to sentence structure, word choice, and tone, helping students enhance the overall quality of their written work. AI chatbots are also available for students' use as self-studying tools, enabling them to swiftly access information, receive answers to queries, and tackle problems in real-time.

On the face of it, therefore, the use of AI in higher education would appear to have significant potential to enhance students' learning experience, help students learn effectively, provide them with personalized support, and improve their academic performance. In their interactions with students, universities also depend on AI technology, utilizing it, for example, for customized and/or automated

assessments, plagiarism detection, and AI-powered curriculum- and learning analytics.

However, concerns about the advancement and influence of AI on teaching and learning – most recently in relation to chatbots like ChatGPT – have also been raised by stakeholders in higher education and by scholars of teaching and learning, particularly around issues of assessment/ examination and academic integrity/ethics (e.g., Eke, 2023; Rudolph et al., 2023; Vincent-Lancrin & Van der Vlies, 2020; Yeadon et al., 2023). Sources in the literature emphasize that far too little is known about how AI is impacting and will continue to impact higher education – in positive or negative ways – in the coming years (e.g., Adiguzel et al., 2023; Holmes, 2021; Zawacki-Richter et al., 2019).

Much recent research on AI in higher education (e.g., García-Peñalvo, 2023; Rudolph et al., 2023) laments the lack of empirical research to support claims about the benefits – and the challenges – of AI in education from a stakeholder perspective (this is especially true as far as generative AI is concerned, Bates et al., 2020). The present study wants to address this dearth of empirical research with stakeholders in education and provide a basis for more informed discussion about AI in higher education.

Objective

Based on a survey with tertiary level students across universities in Sweden, this report presents high-level findings from a large study of students' use of chatbots and other types of AI-tools for learning purposes, and their attitudes concerning such tools in education. Survey research is an important method for collecting empirical data on higher education stakeholder perceptions, and students, we argue, are particularly important to study in this regard. Students are key beneficiaries of AI in higher education and their perceptions can provide important insights into how the technology is affecting their learning (outcomes, engagement, and overall experience). By extension, insights from student perception studies can be utilized to shape policy decisions and educational practices regarding the integration of AI in higher education.

The report is deliberately brief, descriptive, and lacking in detailed interpretation of the findings; our objective to this end is to provide but a timely foundation for further discussion and inquiry about chatbots and other AI, from the point of students in higher education. We rely mainly on visualization - rather than extensive text - to present the results, in the hope that figures will convey the main points from the survey in an accessible way.

This report utilizes language intended for a broad readership. However, we recognize that some of the technical terminology used may not fully align with the definitions commonly used in AI research.



I think we will need to learn to live with AI and take advantage of the benefits of AI instead of completely banning it.

Comment from one of the respondents

Study Design and Methods

We prepared, piloted, and implemented a survey using Questback in the spring of 2023. The survey opened on 5 April and closed on 5 May; some prompts were inspired by a recent survey on AI in American colleges (Welding, 2023).

The survey contained three sections.

Section 1 was about AI chatbots and asked about the respondents' knowledge of and attitudes towards ten of the most widely used chatbots.

The second section of the study focused on various other AI language tools (e.g., writing assistance tools, translators, speech-to-text, and language learning apps) widely regarded as useful for student learning (cf. Holmes & Tuomi, 2022). Definitions of these AI tools were provided in the survey. In this section as well, we gathered information on the participants' knowledge and attitudes towards these AI technologies.

The last section obtained information about the respondents' background and provided space to provide additional comments on the use of AI tools and chatbots.

A link to the survey was distributed through several different channels, primarily networks at various universities in Sweden. We also partnered with a media bureau that ran a survey campaign on our behalf on Meta platforms and, for a short period of time, LinkedIn.

Our methods of recruiting student respondents left us with a convenience sample of 5,894 students. The data were, at this point, analyzed through simple descriptive statistics. While the sample is not representative in a statistical sense, it is, in several ways, representative of the diversity in the underlying student population, for example in terms of *gender* (with a representative balance between genders), *academic level* (first-, second, and third-cycle students were represented in the sample); *discipline* (responses were recorded from across the disciplinary spectrum), and *university affiliation* (28 universities contributed with at least 1 % to the total participant responses).

The open-ended comments (n=1707) were analyzed using recursive reading of all comments; subsequently we conducted a thematic analysis of a random sample of 500 comments.

Findings

The survey responses provide insights into the current level of adoption, attitudes, and utilization of AI chatbots and other forms of AI in higher education among students. In addition, the qualitative comments offer further understanding of students' usage patterns and perspectives.

Familiarity and usage of AI chatbots

The summarized results for the prompt, "Rate your familiarity and frequency of use with a selection of AI chatbots," are presented in

Figure 1. Respondents were provided with four response options: "Familiar and regularly use it," "Familiar but rarely use it," "Familiar but never use it," and "Unfamiliar,".

ChatGPT stands out from the rest of the chatbots, with an overwhelming 95 % of respondents claiming to be familiar with it. Additionally, over a third of students (35 %) reported using ChatGPT regularly. Conversely, only a small percentage of students reported using any other chatbot regularly and, in fact, most of the other chatbots were unfamiliar to students (except for Bing, Bard, and OpenAI playground).



I believe that AI has great potential as a complement to traditional educational methods when it comes to individual learning. However, aside from the potential, the rapid development of AI raises many ethical questions, which are often addressed too late and to a limited extent.

Comment from one of the respondents

Rate your familiarity and frequency of use with a selection of AI chatbots:

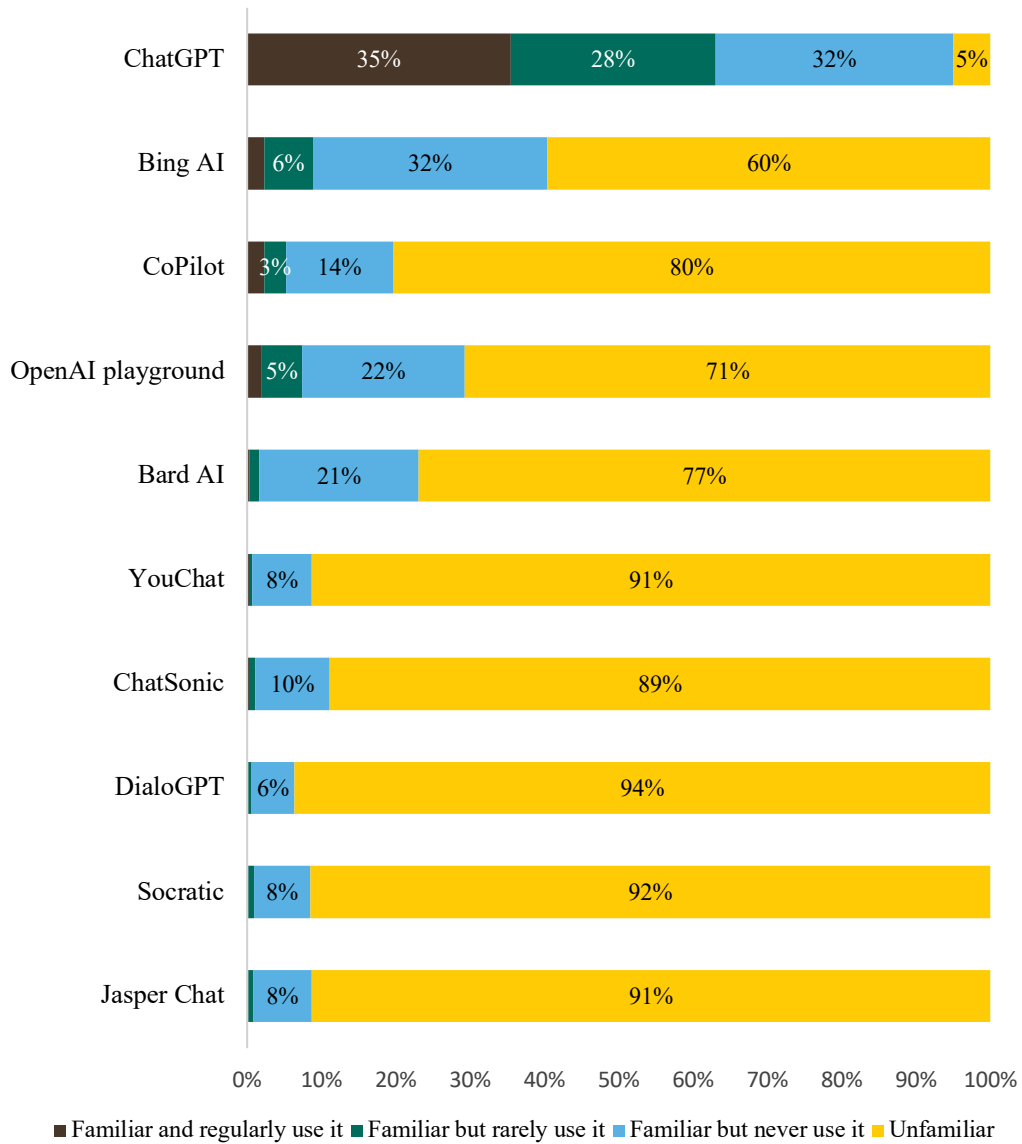


Figure 1: Familiarity and usage of AI chatbots among (first, second and third cycle) students. Missing answers were ignored, the resulting N varies between 5802 and 5882 responses.

Attitudes towards AI chatbots

The survey featured ten statements regarding chatbots and their relationship with education. Figure 2 illustrates the percentage of students who either agreed, disagreed, or indicated uncertainty or a preference not to respond. The results indicate that a majority of the students (56 %) have a positive attitude towards the use of chatbots in education. Moreover, 48 % of the students agree that the chatbots they use contribute to their effectiveness as learners, even if few respondents (17 %) see a connection between chatbot usage and their study grades. A minority (28 %) believes that using chatbots goes against the purpose of education, but the majority (58 %) does not agree with this statement.

However, the students' views are not all positive. Over half of the students (54 %) harbor concerns regarding the potential impact of chatbots on education in the future. Furthermore, 50 % of the students disagree with the notion that chatbots yield better results than what they can achieve on their own, but 18 % believe that chatbots outperform them.

With regard to academic integrity, 62 % of students concur that employing chatbots to complete assignments and exams is a form of cheating. Interestingly, an almost equal number of students (60 %) oppose the prohibition of chatbots in education.

When asked about rules or guidelines for the responsible use of chatbots provided by their teachers and university, approximately a quarter of the respondents (26 %) said that they had not received any such guidelines and, maybe even more concerning, 55 % selected the "Don't know/prefer not to say" option.

Collectively, these findings indicate that many students have a positive attitude towards integrating chatbots into education and find them beneficial for enhancing their learning experiences. However, alongside these positive sentiments, there are substantial concerns and uncertainties surrounding the establishment of rules and the future implications of AI chatbots in education.



When the calculator was introduced, it didn't mean that math teaching stopped in school, it became a tool. Similarly, education should learn to coexist with AI tools.

Comment from one of the respondents

Do you agree or disagree with the following statements about AI chatbots in general?

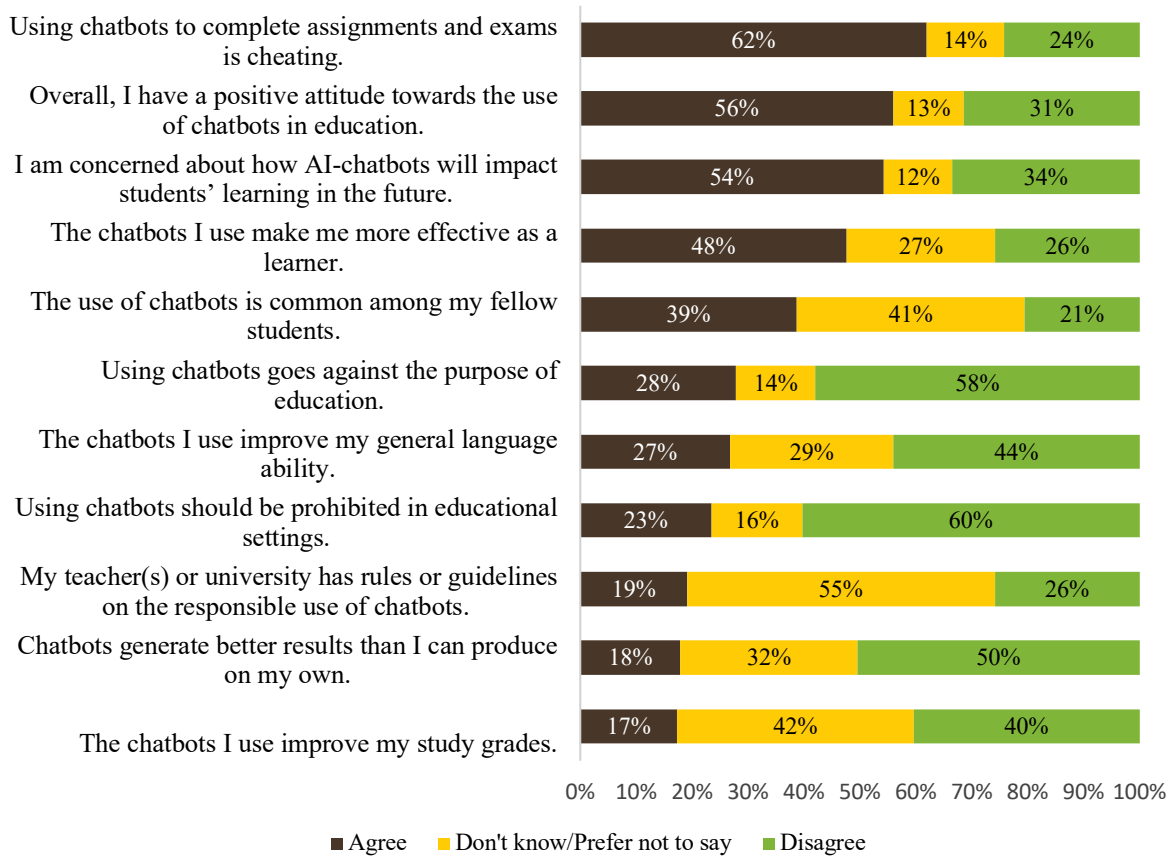


Figure 2: Students' attitudes towards AI chatbots (first, second and third cycle). Missing answers were ignored, the resulting N varies between 5855 and 5877 responses.



AI is great for simpler tasks. I think the problem is the examination itself. Take home exams will become extinct.

Comment from one of the respondents

Familiarity and usage of other

AI language tools

Aside from AI chatbots, we also obtained data on students' familiarity with and usage of various other AI language tools. Figure 3 displays our results for four distinct types of language tools. Similar to the chatbots prompt, participants were given four options to choose from regarding their familiarity with each tool: "Familiar and regularly use it," "Familiar but rarely use it," "Familiar but never use it," and "Unfamiliar."

In contrast to the various AI chatbots presented in Figure 1, students demonstrated extensive familiarity with all four types of AI language tools featured in Figure 3.

In particular, language translation tools were recognized by virtually all students (99 %), and this was also the most prevalently used type of AI among respondents. The other language tools, including speech-to-text transcription, online writing assistants, and language learning apps, exhibited similar patterns. Approximately 79-90 % of students expressed familiarity with these tools, and around 20 % reported regular usage.

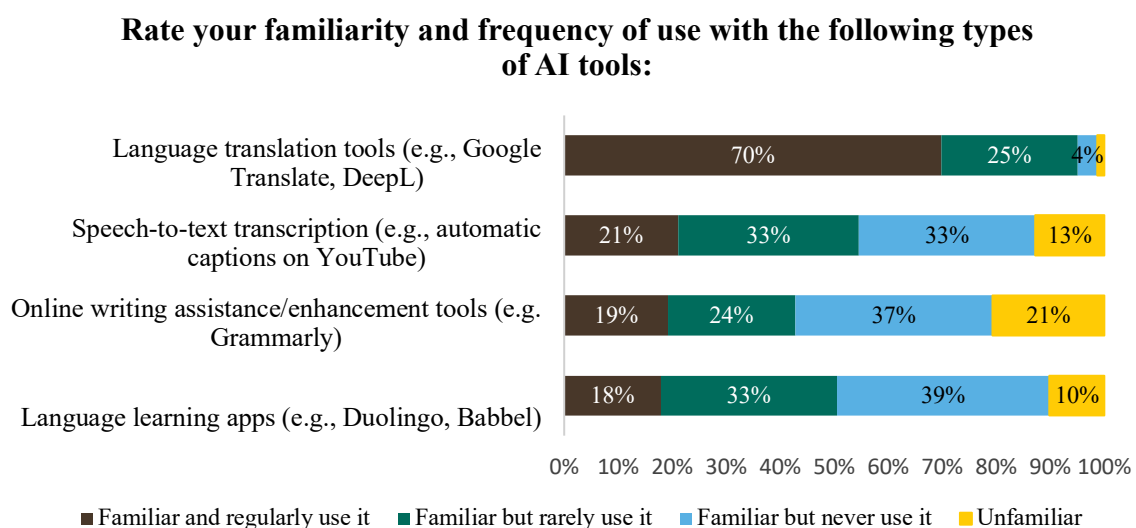


Figure 3: Familiarity and usage of AI language tools among (first, second and third cycle) students. Missing answers were ignored, the resulting N varies between 5861 and 5866 responses.

Attitudes towards other AI language tools

The last section of the quantitative part of the survey focused on students' attitudes towards AI language tools in education beyond chatbots. The section included ten statements, and the percentage of students who agreed, disagreed, or chose the "don't know/prefer not to say" option for each statement is presented in Figure 4.

Overwhelmingly, students have a positive attitude towards the use of AI language tools in education; 79 % are positive and only 9 % express a negative view. Similarly, to chatbots, a significant portion of students (65 %) believe that employing AI language tools enhances their effectiveness as learners. Additionally, many students (59 %) expressed the belief that these tools contribute to improving their overall language proficiency, while 49 % agreed that AI language tools aid in enhancing their academic writing skills. These findings suggest a widespread adoption of these tools for educational purposes, emphasizing their significant role in learning.

Just as the situation with chatbots, only a small proportion (11 %) of students reported being familiar with regulations or guidelines

governing the use of AI-language tools in education. By contrast, a larger percentage of students (29 %) reported that no regulations have been implemented, and a majority (60 %) indicated they were unsure of the existence of such regulations.

However, the students' attitudes towards the use of AI language tools in relation to exams and assignments differ significantly from their views on chatbots in this regard. The majority of students (57 %) believed that utilizing these tools to complete exams and assignments should not be considered as cheating.

Furthermore, it is worth noting that the students seem to be less worried about the potential impact of AI language tools on future education compared to chatbots in particular: only 20 % express concern, while a majority (63 %) say they are not concerned.

Overall, these findings suggest a generally more positive attitude towards AI language tools for educational purposes compared to chatbots like ChatGPT. The results also indicate a widespread adoption of AI language tools and less concern associated with their usage.



I believe there is enormous potential in the use of AI tools, but universities and schools overall must develop clear frameworks and guidelines for it to work.

Comment from one of the respondents

Do you agree or disagree with the following statements about AI language tools?

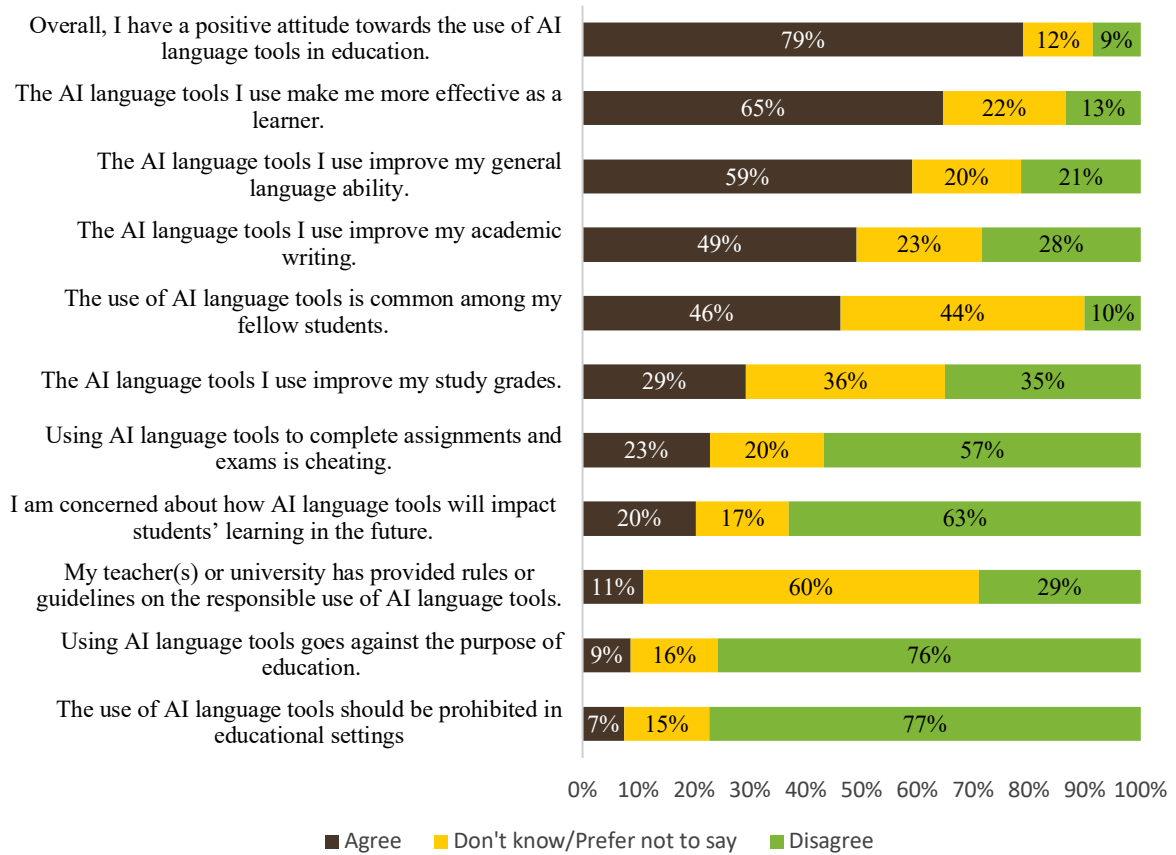


Figure 4: Students' attitudes towards AI language tools (first, second and third cycle). Missing answers were ignored, the resulting N varies between 5831 and 5861 responses.



I am concerned that my skills, both artistic and academic, will be replaced by AI. I am also worried that the study methods I excel at (such as take-home exams) will be removed as people rely on AI.

Comment from one of the respondents

Qualitative results confirm survey patterns

A **significant** percentage of the survey respondents (29 %) took the time to provide their individual thoughts and feedback. The large number of comments received is indicative of the high level of engagement and interest the students have in the topic of the survey. Our analysis of a sample of the comments revealed the following three major themes:

1. The adaptation of education systems to integrate AI in teaching and learning.
2. Legitimate functions of AI and its major applications in higher education.
3. Ethical considerations of using AI chatbots and other AI in completing assignments and exams.

Consistent with the survey findings, many students speak out against the prohibition of AI in education, stating that banning AI would be counterproductive and almost impossible given its prevalence in their personal and professional lives. Many respondents compare AI to other technological advancements, such as calculators, the internet, and Google, and argue that the education system should adapt and “modernize” itself to integrate the use of AI.

Respondents suggest that universities should develop new AI-related courses and curricula to teach effective, responsible, and ethical use of AI in educational settings. Additionally, respondents recommend that universities implement guidelines and instructions to regulate the use of AI in teaching, learning, and assessment. Some respondents also believe that the use of AI should currently be prohibited in exams, at least until education systems are adequately prepared for its integration.

Many comments focus on the respondents’ perceived legitimate use of AI chatbots in educational settings and how students use them for learning. Respondents use metaphors such as “private tutor,” “teacher,” “counsellor/mentor,” and “fellow student” to describe AI chatbots as interactive sources of learning. For example, they report using AI chatbots to seek further explanations, get inspiration, ask questions, make summaries of lectures and readings, and improve their academic writing performance. The comments emphasize that AI should complement and aid learning, rather than replace students’ thinking and learning process. As one participant noted, “You should not use a calculator if you don’t know what the plus sign on it does.”

The survey respondents also acknowledge the potential drawbacks of relying on AI language tools, such as the possibility of generating inaccurate or unreliable results, as well as the difficulty in determining the origin of the data. Consequently, many respondents emphasize the importance of developing critical digital literacy and source evaluation skills when utilizing AI tools for learning purposes.

The survey questions regarding the use of chatbots and AI language tools in connection with assessment triggered a variety of viewpoints in the comments section. While most of the students stated that using AI language tools (e.g., writing assistants) in exams is acceptable (except for language-related subjects), the specific use of chatbots is controversial: Asking a chatbot to write an entire text and submit that text as one's own work is perceived as cheating but using AI to study and prepare for exams (e.g., searching for information, improving writing, and doing cross-checking) is not. Many students also urge universities to develop AI plagiarism check tools and reform assessment methods to integrate AI in the process of assignments to prevent the misuse of AI during assessment. Students suggest, for example, developing guidelines for the use of chatbots in assessment, adding oral examinations based on

submitted work, and designing assignments that somehow integrate AI and students' critical thinking.

In addition, and consistent with other survey results, certain students express concerns about the impact of AI technology on education and society at large. These comments underline sentiments of “worry” about AI taking over, as well as “fear” of being "left behind" by technological advancements. We contend that such comments highlight an urgent need for higher education to provide more guidance and resources for students to become familiar with AI technology and its potential in education.

Lastly, the comment data reveal an unanticipated theme, highlighting the perceived value of AI for students with special needs. Many respondents share anecdotal narratives suggesting that AI chatbots and language tools can provide substantial support for individuals with disabilities such as dyslexia, ADD, ADHD, and autism. Almost unanimously it seems, this group of students would appreciate greater integration of AI in higher education. These findings underscore the importance of AI implementation in catering to the diverse learning needs of university students.



It's important that students learn how to use new tools and emerging technology...It's also really important for Sweden's competitiveness that new technology is taught and incorporated in education in a nuanced way and not prohibited.

Comment from one of the respondents

Concluding remarks

In an ideal world, higher education policy decisions should be informed by a solid understanding of the educational practices and the perspectives of all stakeholders involved. Such an approach ensures that policy decisions are effective, relevant, and responsive to the changing needs of students, educators, and the higher education sector at large. This survey sheds light on how students are interacting with and perceiving AI in higher education, and we hope that the findings presented here will provide a foundation for further informed discussion about the role(s) of AI in higher education.

The present study has some limitations that must be acknowledged. Most importantly, although we succeeded in collecting a comparatively large and diverse sample of the student population in Sweden, we used convenience sampling through an open link that was distributed to the target group via a multitude of channels. This means that caution is advised when generalizing the findings from this sample as the students self-selected to participate. Without information on those who declined to participate, it is impossible to calculate the response rate or examine potential non-response bias systematically. Moreover, it is important to note that

theoretically, anyone with access to the open survey link could participate. However, the survey's title, promotional and informational texts, and the background questions in the final section were developed to discourage participation from non-students. A final limitation of our study is the binary-scale design used for key questions. We acknowledge that this design may have prevented respondents from expressing more nuanced opinions. All these limitations were carefully considered during the early phases of the design process and, ultimately, a balance had to be struck between sample size, time effectiveness and strict reliability/validity concerns.

Despite these limitations, we believe that the findings presented here provide valuable insights into students' engagement with AI in higher education and contribute to the rapidly growing body of research in this area. Needless to say, the high-level descriptive findings presented in this report beg further probing. To this end, our immediate plans are to further examine subgroups and potential systematic relationships between students' backgrounds (i.e., gender, level of study, discipline, and university affiliations) and answer tendencies. Further, we aim to delve deeper into the richness of the qualitative data, exploring it more thoroughly.

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