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ABSTRACT

Artificial Intelligence (AI) is rapidly disrupting education and the employment prospects for recent university graduates. This study examines the prevalence, motivations, and perceived effects of AI usage among undergraduate Physics degree students at a London research university during Spring 2026. Student voice was sought on the key question of how universities should respond to the changing landscape. Applying a mixed-methods design, data was collected through a survey, analyzed with descriptive statistics, and semi-structured focus groups, analyzed through a qualitative coding analysis. In general agreement with a range of recent studies, we find the Physics degree student uptake of AI at a near-universal 90%, motivated by efficiency, conceptual support, and social pressure stemming from perceived peer advantage from using AI. Several students regarded oral examinations as a robust assessment of their learning. A majority of the students displayed an acute awareness of issues surrounding AI, such as over-reliance, skill erosion, job market displacement, and environmental impact. The nuance found in students' in-person discussions, underexplored in previous studies, is highlighted here.

Since the release of popular Artificial Intelligence (AI) chatbots in late 2022, university students have rapidly adapted to using AI, highlighted by Stephenson and Armstrong¹ finding an increase from 66% to 92% of students using AI between two large samples of UK students from November 2023 and December 2024. More broadly, a range of studies have looked at the motivations and use cases of AI by university students in the UK¹⁻⁵, USA⁵⁻¹⁶, Europe^{4,17-22}, Asia^{5,23-31}, Africa^{32,33}, Australia³⁴, and South America^{5,35}. The findings generally show a majority of students use AI to support their conceptual understanding^{1,3,7,10,19,23,28}, receive individualized feedback or virtual tutoring^{1,6,11,12,20,25}, and boost their perceived efficiency in completing assessments^{5,21,28,35}. Most students are aware of concerns regarding academic integrity, over-reliance, and trustworthiness when engaging with AI tools^{1,8,13,18,20,25,28,32}. Another common finding is the students' concerns about their career prospects due to AI^{1,3,9,18,26,28}. Much less investigated are students' concerns about AI based on the environmental impact caused by data centers^{1,9}.

Several of the studies cited analyzed students' written responses to open-ended questions in their survey instrument^{6,10,12,13,19}, while fewer have conducted interviews or focus groups with students²³⁻²⁶. Our study draws on the later, adopting a mixed methods approach using a survey and in-person discussions with students to elicit their views in a more dynamic discursive environment. As universities develop policies on AI use, understanding how students perceive the educational, ethical, and societal implications of shifting AI policy is essential for evidence-based institutional responses.

Surveys comparing AI usage between students in science, technology, engineering, and mathematics (STEM) fields and non-STEM fields showed a more frequent early uptake of AI by STEM students^{7,8,18,35}. Our study adds to the growing literature focused on Physics students¹⁰⁻¹⁷. Fouad and Bentley¹⁰ found that while 91% of Physics students reported using AI for coursework, only 41% trusted AI-generated explanations of Physics topics, and 65% preferred optional over mandatory AI integration to their studies. Similarly, Black and Tomlinson⁶ found for students in other disciplines that regular AI users still expressed active skepticism of AI-generated content and sought to maintain their intellectual independence and skill-sets.

This study examines undergraduate Physics students' perceptions of generative AI at a London research university. We investigate the prevalence and motivations of AI use, students' perceived benefits and concerns, and their views on how universities should adapt to the widespread availability of generative AI. Beyond documenting patterns of AI use, our findings highlight the role of social pressures in shaping AI adoption and provide insight into students' perspectives on assessment reform and the future of AI in higher education.

Methods

This study employed a mixed-methods design³⁶, utilizing both survey data and semi-structured focus groups. We chose this approach to both identify patterns in perception of AI across a larger sample of Physics degree students, and to discover emergent and nuanced views and motivations via a qualitative analysis of the focus group discussions³⁷. This study was reviewed and approved by the Research Ethics Panel at King's College London (reference LRU-25/26-53910). All methods were carried out in accordance with relevant guidelines and regulations. All participants in our study provided their informed

consent prior to taking part, were assured of their anonymity, and were made aware of their right to withdraw from the study at any time without consequence. No demographic information was asked of the students.

The survey was distributed to all undergraduate Physics degree students at King's College London through in-person and email advertising, resulting in 71 complete responses from a cohort of about 550 students. Considering over half the Physics students do not regularly attend lectures, an issue beyond the scope of this study, the survey uptake is deemed representative of actively engaged students. The survey contained 12 questions: two multiple-choice items on the student's amount of AI usage informing the remaining questions, four multiple-choice on types of AI usage and concerns regarding AI, five multiple-choice using a Likert scale expanding on academic use and concerns of AI, and an open-ended question on the same themes. Informed by previous studies^{2,18}, the multiple-choice questions provided strong descriptive data of AI usage and concerns, with the Likert scale questions, in particular, identifying areas of disagreement between students. The open-ended question primarily acted as a screening device to select participants for the focus groups, described below, and was not further analyzed.

Focus group participants were recruited through purposive sampling, selecting respondents whose open-ended survey responses demonstrated particularly reflective or substantive engagement with the topic. We ran five one-hour-long focus groups, including 15 participants in total, with individual participation averaging 3 per session. Across the hour, the students were asked 6 questions building on the survey questions. The students were encouraged to respond to one another and ask further questions in an attempt to develop as rich a picture as possible of their perceptions on AI. Focus groups were both recorded and transcribed to be later analysed through a thematic analysis informed by Braun and Clarke³⁸.

Results

Survey Analysis

Survey responses from 71 undergraduate Physics degree students were obtained. From the first survey question asking how often the student uses AI, the results show 90% of students use AI regularly: either as daily users (37%) or as occasional users (53%) a few times a week or less. Only 10% of the students reported that they rarely or never used AI. A second follow up question asked what fraction of their AI use is for academic purposes; of all respondents, 55% reported that most of their AI use is for their studies, with the remaining 35% reporting half or less of their AI use is for academic purposes, not including the 10% non-users of AI. Each student's response to the first question was then used to categorize them as daily, occasional, or non AI users.

Figure 1 shows the results of the four survey questions on the types of AI use of the students and their concerns and perceived benefits of AI use. Including both daily and occasional AI users, 83% reported they use AI to improve their conceptual understanding of a given Physics topic. The second most frequent response (total 44%) was to use AI to get feedback on their academic work. Between daily and occasional AI users, no clear difference is seen in their types of academic AI usage. For the next question on students' concerns of AI use for their studies, 65% of all participants listed the trustworthiness of AI output as a concern. Over-reliance of AI use for either Physics concepts (52%) or problem-solving (64%) were interestingly common responses, particularly since only 8% of AI users listed no concerns with academic AI usage. Here, a divide is seen, where occasional AI users are more concerned than daily users. This may reflect among daily users a greater familiarity, and thus reduced perceived risk, or it may suggest that daily users are less likely to critically reflect on their usage patterns.

The next question asked about prospects of AI usage beyond their studies. The majority of students responded that the main benefit of AI usage is to quicken tasks and improve efficiency, with 72% of all respondents choosing this option. The next most chosen option (48%) reflected the idea that work after university will integrate the usage of AI. Connected to the issue of trust in AI evident in the previous question, more daily users than occasional users listed that AI will help develop knowledge in a range of topics. The last question in figure 1 asked about potential concerns of AI usage in terms of broad ethical issues. Interestingly, a range of ethical considerations were evident among the majority of participants, including: privacy of personal data and control of the dominant AI tools by a handful of powerful private companies (64%), the environmental impact of AI data centers (57%), copyright infringement of AI companies in training their AI models (49%), and the option of other concerns (44%). Only 13% of all participants listed as an ethical concern the inequality of availability of AI tools due to cost. Following the trend of academic concerns in a previous question, daily users had consistently less ethical considerations than occasional and non-users. This is a predictable response from students who have already bought into the daily habit of AI use. Still, even in this group of daily users ethics considerations are present.

Figure 2 shows results of the Likert scale questions in the survey on AI usage and concerns. When asked if AI better helps the student understand their Physics degree content, 70% either agreed or strongly agreed. Similarly, a majority (69%) either agreed or strongly agreed that AI allowed them to tackle harder problems or concepts than if they did not use AI tools, while a startling 56% of participants agreed or strongly agreed that AI use lessened the extent to which they engaged with the Physics problems they faced. Together, this suggests that whilst students are more open to difficult Physics problems with the assistance of AI tools, the learning outcomes with AI use are questioned by students themselves. These results indicate that about half of Physics degree students acknowledge the potential deterioration of their academic development when using AI

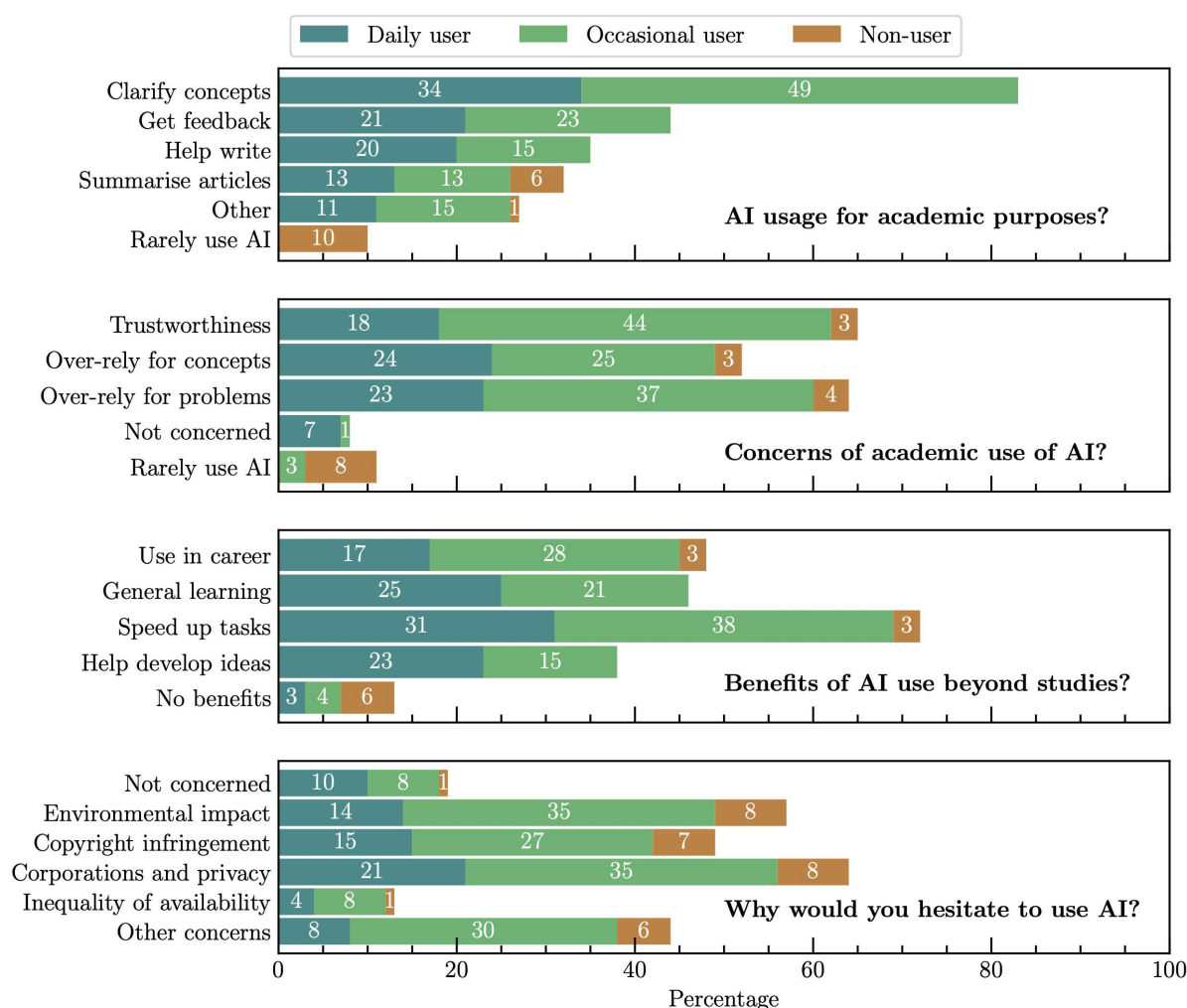


Figure 1. Students' responses to the survey questions on AI usage and concerns. Students self-identified as either daily, occasional, or non-users.

tools. The next two questions asked the Physics students if they prefer using AI instead of either seeking help from their peers or their instructor, with a majority of participants (58% and 62%) either agreeing or strongly agreeing. This finding was further explored in the focus groups.

Focus Group Analysis

Here, we present themes that emerged from five semi-structured focus groups, which had 15 participants in total. In each focus group, the students were asked six questions and encouraged to respond to one another and ask questions themselves. Table 1 lists the codes and themes that emerged in our analysis.

Reasons to use AI

Physics degree students across the focus groups described using AI as a core part of their academic toolkit. Main reasons cited were to supplement a perceived insufficiency in institutional resources, and to personalize their learning. This was characterized by students utilizing AI to evaluate their work, generate new questions, re-explain concepts, and help answer questions, as illustrated in the quotes below:

I get it to either rephrase something that a textbook is saying, or I just ask it like questions, very like specific ones ... in solving problems, I get it to give me hints sometimes which is quite helpful.

So it's good to just get like a different perspective and like you might find a method that is like more intuitive for you.

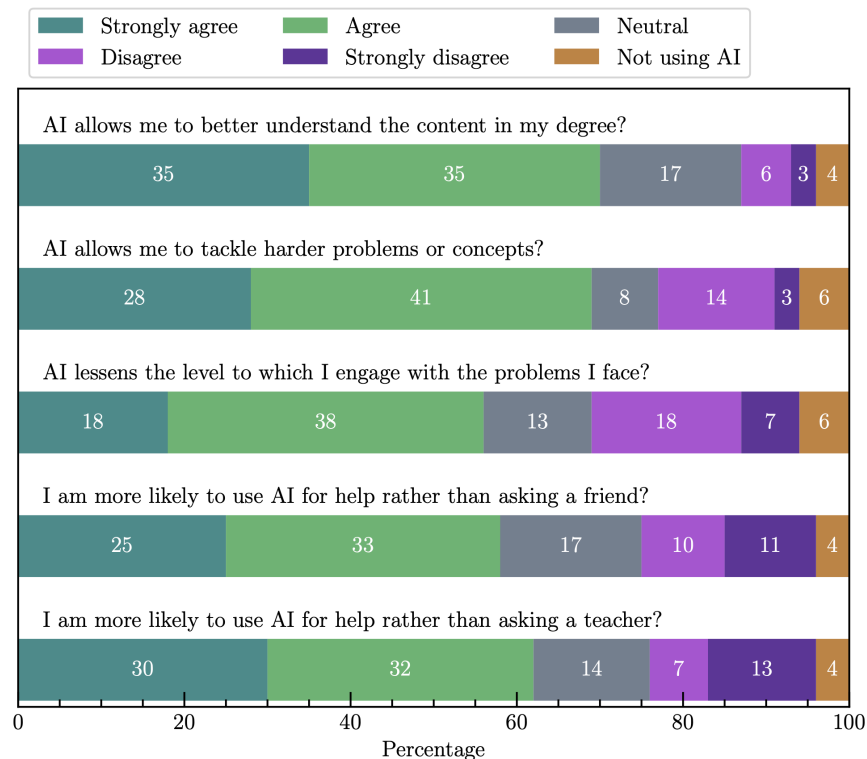


Figure 2. Students' responses to the survey Likert scale questions on AI usage and concerns.

There's not been a coding problem I've found that it can't do instantly.

This paired with a preference for help from AI over both peers and instructors, citing AI's practicality and ease of use as key factors in its usage. Several participants stated that AI is able to fill in gaps that other students may be unaware of. Removing the fear of being judged as academically weak when speaking with an instructor was cited as a key feature of using AI. Further, AI was perceived as more neutral to prior knowledge assumptions than speaking with a human.

We got given some papers and the lecturers wouldn't release the answers. ... if I come to office hours, are you willing to mark my whole paper with me?

It might feel like a stupid question to ask someone else ... it's like judgment-free.

You think you're the only person asking it such like stupid questions. So you think like, oh, I can't go ask anyone else because they'll find out how like incompetent I am.

If the answer isn't sufficient for me, or if I don't have time to properly ask it, then I will also ask AI. Usually when I ask other people, they usually say, oh, that's a really good question, 'cause we're on the same page.

Students reported that a common AI use case is for work they considered time-consuming and not central to their academic development, highlighting efficiency as a motivating factor behind AI usage. Producing laboratory reports or programming language code were the most frequently cited examples. Students viewing these tasks as areas where AI performs reliably well and where the time saved could be redirected toward deeper engagement with Physics concepts. The turn to AI was often justified as a response to a perceived overwhelming workload, as opposed to showing a lack of engagement with the material.

An interesting theme emergent from the focus groups is the perceived pressure on Physics degree students to use AI to not be academically disadvantaged compared with their peers who are AI users. This social dynamic suggests one key factor in the near-universal AI use by our survey participants, even by those students who initially opposed AI, and may still dislike it.

It's like a self-fulfilling prophecy even if you wouldn't use it for like moral reasons or whatever, you're like, oh, but I'm gonna get surpassed by people who maybe don't even try hard just because they have [AI tools].

It's so heavily used in society where it's sort of like, if I'm not using it or I have like a stand against it, it feels like I'm falling behind.

Theme	Code(s)	Excerpt
Reasons to use AI	Support studying Improve efficiency Prefer to humans Peer pressure	<i>I've been more like productive in the sense that I'm not spending hours on like one equation, one question, and I can actually do other stuff as well.</i> [Codes: support studying, improve efficiency]
Concerns with AI	Over-reliance Skill erosion Imposter syndrome Environmental impact Job disruption	<i>It's becoming more difficult to make yourself problem-solve. Basically, I think that's the biggest issue, especially in Physics.</i> [Codes: over-reliance, skill erosion]
Institutional response	Integrate into teaching Assessment integrity Oral exams	<i>An oral exam is actually a conversation with someone who can ask you like nitpicky questions about how deep your understanding goes, and maybe that's the best form of assessment.</i> [Codes: assessment integrity, oral exams]

Table 1. Themes and codes developed from the focus groups, with example student quotes and coding.

Before I went to uni, I was extremely anti-AI. But because everybody else is using it in uni, it's kind of like the case of I have to use it to get on the same level with people.

Concerns with AI

Issues with AI usage became a major theme across the focus groups. A majority felt that AI acts to shortcut their learning process, harming their development of problem-solving and critical thinking skills. A participant acknowledged this harm in the context of gaining efficiency,

I guess it's the art of writing, but we just won't be able to refine those skills at university unless you're willing to do that at the price of a grade... It's sad... I think it's just like a workload problem, like a lot of people, yes, have AI for like efficiency.

Related, over-reliance on AI for academic competence emerged as a primary concern, mostly among the occasional AI users. More frequent AI users felt that over-reliance on AI was not a problem, and often justified their views through analogy, appealing to the likely staying power of AI.

If I am over-reliant on it, for coding specifically, I don't think that's an issue because I think that in the future you're never going to see a human programmer only do human programming. It's going to be a mix of human programming and AI

It's like if you were to ask someone, are you over-reliant on Google? Because that's just something that's just always going to be there. So, yeah, I'm not really too worried. It's kind of like my Maths teachers saying you're not always going to have a calculator in your pocket. It's like, I have a phone.

A few participants mentioned they hide their AI usage from their peers, resulting in an isolated struggle with the problems they face. Whilst AI provides a “judgment-free” experience, this suggests its usage may lead to students being less socially engaged.

It's making my imposter syndrome worse because you can hide that [AI usage] from people very well. And it's like, you know that everyone is probably thinking the same thing, but you never sit down and have a conversation about it.

Concerns were not restricted to their academic life, but further extended to ethical and societal issues. The most pressing problem discussed in all focus groups is the environmental impact of AI. However, similar to the discussions on AI over-reliance, the daily AI users pushed against this concern, feeling that environmental concerns are over-inflated.

Any positive changes we have made in the last like 20 years to fix that [climate change], these data centers are reversing. Data centers are using so much water that people living nearby have no water in their houses.

I had ChatGPT one time when I was typing into it, I said, after every response, list how much carbon I've wasted, and I wasted like, you know, after hours, like 1 gram of CO₂.

I don't know, there's an environmental impact to everything you do, like charging your phone is just as bad.

A much more universal concern for students existed in the job market, feeling as if their future was in jeopardy with AI replacing not just entry-level jobs, but also whole fields which they wished to pursue as a career.

As a Physics student too, I had a conversation with a Mathematical Physics researcher, and he basically told me that, like, theory is going to die in like 2 years.

The problem is that why would you pay a human to do the research if you could just have AI?

A lot of like entry-level jobs are like essentially being replaced by AI.

Institutional response

When the focus groups turned to whether students wish for AI to be integrated into their course, most resisted the idea, but some felt it would be useful to see how AI could be incorporated into their studies. Generally, the participants felt that their current AI use was so easily done that instructions on how best to use AI were unnecessary. Also, the rapidly changing nature of AI tools was acknowledged.

I see the argument that university was created for the job market, and they should teach us to use AI the right way. Well, what is the right way? It came out in 2022. Does anyone know a right way?

The majority of conversations around institutional responses to AI turned toward assessment. Participants noted that most of the current forms of assessment are significantly undermined, such as online quizzes. An unexpected finding was that several participants expressed a preference for oral examination, either in the form of a presentation, or through a collaborative problem-solving session in which an instructor examines the process of problem solving. Students felt that these forms of assessment not only are most resistant to AI over-reliance, but also best reflect an individual's understanding.

The online quizzes that are multiple-choice, like everyone can literally check the answers with AI before we submit it.

As much as you can use AI to, like, prepare the slides and whatever, but it shows when you're in front of other people explaining something, it shows if you don't understand what you're talking about.

Discussion

This study examined how Physics degree students use AI, how they evaluate its effects, and how they believe universities should respond. Across both the survey and focus groups, AI use was shown to be a routine part of the majority of students' routines, with 90% of survey participants using it at least weekly. Our result is consistent with prior reports that adoption has moved from a minority to a near-universal practice within a few years^{1,7,18,20,35}. In our study, when the Physics degree students were asked about their reasons for using AI, the majority cited efficiency and conceptual support as primary motivations, in line with the existing literature^{1,3,7,10,19,23,28}. The most common academic concerns the participants listed in our survey was the trustworthiness of AI output, and their over-reliance on AI for problem-solving and conceptual understanding, again agreeing with previous findings^{1,6,8,10,13,18,20,23,25,28,32}. Black and Tomlinson⁶, for example, found that students actively distinguish AI-assisted work from their own original thinking and place greater value on the latter, a distinction our focus group participants echoed in describing AI as a tool for developing rather than replacing their thinking.

This study revealed a key driver of students' AI use: social motivation rooted in competition and peer pressure. We found that several students describe using AI not from any personal liking of it, but from a fear of falling behind peers already using it. Similarly, in a California State University report⁹ a student was quoted on their AI use, saying "Even though I don't want to use it, I have to! Because if I don't, then I'll be left behind and that is the last thing someone would want in this stupid job market.". We found the theme of job market prospects connected directly the students' current anxieties with that of their future. Stephenson and Armstrong¹ quoted a student saying "The potential of AI will greatly reduce white collar jobs.", and Chan and Hu²⁸ quoted a student saying "AI may replace the job that I'm interested in.". These concerns of an eroding job market for graduates appear to have some validity based on extensive payroll data in the USA between mid-2025 to mid-2026, which showed that employment of workers aged 22 to 25 years old in AI-exposed jobs was 19% below its expected level based on less-AI-exposed peers³⁹.

Our findings suggest AI adoption by students is not strictly an individual cost-benefit decision, but is a social phenomenon shaped by perceived competition. The student welfare implications are distinct from, and arguably under-examined, compared with concerns about academic integrity. This dimension of adoption, complemented by AI's constant, judgment-free availability, was highlighted in Wang et al.²⁵, and appears to isolate students in confusion that would once have been shared and normalized among peers, with students attributing feelings of impostor syndrome to their adoption of AI.

From our survey results, a negative view of AI was expressed by a majority of students in terms of the dominate power held by the few leading AI firms, the environmental impact of AI data centers, and the option of unspecified concerns. Putting

our results in a broader context, we note the results of Devlin et al.⁴⁰ who surveyed the UK general population and found between late-2023 to mid-2026 that attitudes to AI became more negative, with participants in the age range of 14 to 28 years old perceiving that AI has more risks than benefits. The minority of our focus group participants who were unconcerned with ethical issues surrounding AI typically offered justifications for that position, for instance comparing AI's environmental footprint to other routine daily activities, rather than simple disengagement or lack of awareness.

On institutional responses, our focus group participants' views on assessment corroborate studies on students' perceptions of AI-resistant examination^{1,8,19}. The academic integrity of unsupervised coursework and online quizzes were seen as substantially undermined by AI, with in-person invigilated exams viewed as secure. Several of our participants expressed a strong and well-reasoned preference for oral examination, valued for its resistance to AI misuse, and its capacity to reveal genuine understanding through real-time questioning, supporting the discussion in Chirikov et al.⁸. Our findings diverge from suggestions that institutions integrate AI directly into teaching to build students' evaluative capacities^{8,12,17,23,28} since a majority of our participants opposed such integration, arguing that AI's core appeal is its ease of use, and furthermore felt that rapid developments in AI would make the guidance outdated. We note that thematic analyses depend to varying degrees on the context in which students were asked their preferences. Sirnoorkar and Rebello¹², for example, showed their students preferred structured prompts based on the techniques that were proposed to be integrated into teaching. Also, considering our study is more recent than the cited studies which reported a more positive student view on AI integration, our participants' resistance to AI integration may reflect the broader cultural negativity toward AI cited above in Devlin et al.⁴⁰.

We hesitate to generalize our results, considering that participants were drawn from the engaged subset of a single institution and discipline. The students' usage and attitudes on AI were self-reported rather than independently verified, leaving open the possibility that reported behavior diverges from actual practice. Questions left open for future studies are whether the social and welfare dimensions of AI adoption identified here, such as peer pressure, impostor syndrome, and heightened career anxiety are found in other contexts of undergraduate study.

Conclusion

The impact of AI use on undergraduate studies is unlikely to lessen, emphasizing the importance for university staff to understand not only how students use AI, but how they perceive its influence on learning, assessment, and their future careers. This study found that AI has become a routine part of Physics degree students' academic lives, valued for its efficiency, conceptual support, and accessibility. At the same time, students demonstrated a nuanced awareness of concerns regarding over-reliance, skill erosion, assessment integrity, environmental impact, and the declining graduate job market. Our findings suggest that AI adoption is shaped by social pressures, and that students understand when academic integrity is compromised by AI use. Implications for institutional policy suggest furthering AI-resistant assessments, such as invigilated examinations (oral or written), and addressing possible further burdens placed on already stretched pastoral roles, counseling services, and career guidance due to students' anxieties around the effects of AI.

References

1. Stephenson, R. & Armstrong, C. Student generative ai survey 2026 (HEPI report 199). <https://www.hepi.ac.uk/reports/student-generative-ai-survey-2026> (2026).
2. Freeman, J. Student generative AI survey 2025 (HEPI report 61). <https://www.hepi.ac.uk/reports/student-generative-ai-survey-2025/> (2025).
3. Johnston, H., Wells, R. F., Shanks, E. M., Boey, T. & Parsons, B. N. Student perspectives on the use of generative artificial intelligence technologies in higher education. *Int. J. for Educ. Integr.* **20**, 2, DOI: [10.1007/s40979-024-00149-4](https://doi.org/10.1007/s40979-024-00149-4) (2024).
4. Kozak, J. & Fel, S. How sociodemographic factors relate to trust in artificial intelligence among students in poland and the united kingdom. *Sci. Reports* **14**, 28776, DOI: [10.1038/s41598-024-80305-5](https://doi.org/10.1038/s41598-024-80305-5) (2024).
5. Ibrahim, H. *et al.* Perception, performance, and detectability of conversational artificial intelligence across 32 university courses. *Sci. Reports* **13**, 12187, DOI: [10.1038/s41598-023-38964-3](https://doi.org/10.1038/s41598-023-38964-3) (2023).
6. Black, R. W. & Tomlinson, B. University students describe how they adopt AI for writing and research in a general education course. *Sci. Reports* **15**, 8799, DOI: [10.1038/s41598-025-92937-2](https://doi.org/10.1038/s41598-025-92937-2) (2025).
7. Arum, R., Leon, M. C., Li, X. & Lopes, J. Chatgpt early adoption in higher education: Variation in student usage, instructional support, and educational equity. *AERA Open* **11**, DOI: [10.1177/23328584251331956](https://doi.org/10.1177/23328584251331956) (2025).
8. Chirikov, I., Smirnov, I. & Kizilcec, R. F. Generative ai use and misuse call for assessment reform in higher education. *Science* **392**, 818–820, DOI: [10.1126/science.aec5115](https://doi.org/10.1126/science.aec5115) (2026).

9. CSU. Ahead of the curve: What the nation's largest university system is learning about AI. <https://www.calstate.edu/impact-of-the-csu/technology/ai-empowered-csu/Pages/ai-survey.aspx> (2026).
10. Fouad, E. & Bentley, I. Trust-utility gap in introductory physics education: Students' adoption, domain-specific skepticism, and preferences for ai integration. *Phys. Rev. Phys. Educ. Res.* **22**, 020114, DOI: [10.1103/bdl1-6bn4](https://doi.org/10.1103/bdl1-6bn4) (2026).
11. Ding, L., Li, T., Jiang, S. & Gapud, A. Students' perceptions of using chatgpt in a physics class as a virtual tutor. *Int. J. Educ. Technol. High. Educ.* **20**, 63, DOI: [10.1186/s41239-023-00434-1](https://doi.org/10.1186/s41239-023-00434-1) (2023).
12. Sirnoorkar, A. & Rebello, N. S. Introductory physics students' valued features in ai feedback generated from self-crafted and engineered prompts. *Phys. Rev. Phys. Educ. Res.* **22**, 010146, DOI: [10.1103/v3pj-8491](https://doi.org/10.1103/v3pj-8491) (2026).
13. Kortemeyer, G. & Bauer, W. Cheat sites and artificial intelligence usage in online introductory physics courses: What is the extent and what effect does it have on assessments? *Phys. Rev. Phys. Educ. Res.* **20**, 010145, DOI: [10.1103/PhysRevPhysEducRes.20.010145](https://doi.org/10.1103/PhysRevPhysEducRes.20.010145) (2024).
14. Trout, J. & Winterbottom, L. Artificial intelligence and undergraduate physics education. *Phys. Educ.* **60**, 015024, DOI: [10.1088/1361-6552/ad98de](https://doi.org/10.1088/1361-6552/ad98de) (2025).
15. Lane, W. B. Student interactions with generative AI. *Nat. Phys.* **21**, 866–867, DOI: [10.1038/s41567-025-02932-7](https://doi.org/10.1038/s41567-025-02932-7) (2025).
16. Kestin, G., Miller, K., Klales, A., Milbourne, T. & Ponti, G. Ai tutoring outperforms in-class active learning: An rct introducing a novel research-based design in an authentic educational setting. *Sci. Reports* **15**, 17458, DOI: [10.1038/s41598-025-97652-6](https://doi.org/10.1038/s41598-025-97652-6) (2025).
17. Dahlkemper, M. N., Lahme, S. Z. & Klein, P. How do physics students evaluate artificial intelligence responses on comprehension questions? A study on the perceived scientific accuracy and linguistic quality of ChatGPT. *Phys. Rev. Phys. Educ. Res.* **19**, 010142, DOI: [10.1103/PhysRevPhysEducRes.19.010142](https://doi.org/10.1103/PhysRevPhysEducRes.19.010142) (2023).
18. Farinosi, M. & Melchior, C. To adopt or to ban? Student perceptions and use of generative AI in higher education. *Humanit. Soc. Sci. Commun.* **12**, 1684, DOI: [10.1057/s41599-025-05982-7](https://doi.org/10.1057/s41599-025-05982-7) (2025).
19. Balabdaoui, F., Dittmann-Domenichini, N., Grosse, H., Schlienger, C. & Kortemeyer, G. A survey on students' use of ai at a technical university. *Discov. Educ.* **3**, 51, DOI: [10.1007/s44217-024-00136-4](https://doi.org/10.1007/s44217-024-00136-4) (2024).
20. Malmström, H., Stöhr, C. & Ou, A. W. Chatbots and other AI for learning: A survey of use and views among university students in sweden. Tech. Rep. 2023:1, Chalmers Studies in Communication and Learning in Higher Education (2023). DOI: [10.17196/cls.cslhe/2023/01](https://doi.org/10.17196/cls.cslhe/2023/01).
21. Mirea, C.-M. *et al.* Transforming learning with generative AI: From student perceptions to the design of an educational solution. *Appl. Sci.* **15**, 5785, DOI: [10.3390/app15105785](https://doi.org/10.3390/app15105785) (2025).
22. Castro-Lopez, A., Abed, M. E., Cervero, A. & Álvarez Blanco, L. From ai adoption to underperformance? investigating the impact of interactive ai tools on student outcomes in higher education. *Eur. J. High. Educ.* **0**, 1–22, DOI: [10.1080/21568235.2026.2620686](https://doi.org/10.1080/21568235.2026.2620686) (2026).
23. Akolekar, H., Jhamnani, P. & Kumar, V. The role of generative AI tools in shaping mechanical engineering education from an undergraduate perspective. *Sci. Reports* **15**, 9214, DOI: [10.1038/s41598-025-93871-z](https://doi.org/10.1038/s41598-025-93871-z) (2025).
24. Barus, O. P., Hidayanto, A. N., Handri, E. Y., Sensuse, D. I. & Yaiprasert, C. Shaping generative ai governance in higher education: Insights from student perception. *Int. J. Educ. Res. Open* **8**, 100452, DOI: <https://doi.org/10.1016/j.ijedro.2025.100452> (2025).
25. Wang, F., Yu, H., Zhong, C. & Yu, S. Chinese university students perceive generative ai as a low-risk help-seeking space during academic stress and loneliness. *Sci. Reports* DOI: [10.1038/s41598-026-72421-1](https://doi.org/10.1038/s41598-026-72421-1) (2026).
26. Xu, X., Su, Y., Zhang, Y., Wu, Y. & Xu, X. Understanding learners' perceptions of chatgpt: A thematic analysis of peer interviews among undergraduates and postgraduates in china. *Heliyon* **10**, DOI: [10.1016/j.heliyon.2024.e26239](https://doi.org/10.1016/j.heliyon.2024.e26239) (2024).
27. Huang, W., Kong, L., Liu, L., Tu, M. & Hu, C. Ai use and innovation behavior among university students in relation to challenge and threat appraisals. *Sci. Reports* DOI: [10.1038/s41598-026-68160-y](https://doi.org/10.1038/s41598-026-68160-y) (2026).
28. Chan, C. K. Y. & Hu, W. Students' voices on generative AI: perceptions, benefits, and challenges in higher education. *Int. J. Educ. Technol. High. Educ.* **20**, 43, DOI: [10.1186/s41239-023-00411-8](https://doi.org/10.1186/s41239-023-00411-8) (2023).
29. Zhang, J. & Yang, Y. Ai usage patterns and self-rated critical thinking among chinese college students: the moderating role of academic motivation. *Sci. Reports* DOI: [10.1038/s41598-026-62466-7](https://doi.org/10.1038/s41598-026-62466-7) (2026).
30. Mustafa, S. A. & Altrad, A. Artificial intelligence adoption future ready skills and graduate employability in higher education. *Sci. Reports* DOI: [10.1038/s41598-026-64272-7](https://doi.org/10.1038/s41598-026-64272-7) (2026).

31. Aldbyani, A., Wang, G., Chuanxia, Z., Leng, J. & Al-barha, N. S. Mindfulness and artificial intelligence self-efficacy among university students: the mediating role of artificial intelligence literacy. *Sci. Reports* DOI: [10.1038/s41598-026-61009-4](https://doi.org/10.1038/s41598-026-61009-4) (2026).
32. Abubakar, S., Jeilani, A. & Yusuf, M. The role of over-reliance on ai in the negative consequences of student learning: The moderating effects of ethical concerns and institutional policies. *Cogent Educ.* **12**, 2591503, DOI: [10.1080/2331186X.2025.2591503](https://doi.org/10.1080/2331186X.2025.2591503) (2025).
33. Owusu, E., Debrah, R. & Oladapo, H. Artificial intelligence in higher education: Student perceptions of the adoption and integration in ghana, west africa. In Coman, A. & Vasilache, S. (eds.) *Social Computing and Social Media*, 257–271 (Springer Nature Switzerland, 2025).
34. Chung, J. *et al.* The use and usefulness of genai in higher education: Student experience and perspectives. *Comput. Educ. Open* **10**, 100347, DOI: <https://doi.org/10.1016/j.caeo.2026.100347> (2026).
35. Paredes-Aguirre, M. *et al.* Understanding perceived learning and the role of digital self-efficacy in generative ai adoption among stem and non-stem students. *Cogent Educ.* **13**, 2614093, DOI: [10.1080/2331186X.2026.2614093](https://doi.org/10.1080/2331186X.2026.2614093) (2026).
36. Creswell, J. W. & Plano Clark, V. L. *Designing and Conducting Mixed Methods Research* (Sage, 2017), 3rd edn.
37. Cohen, L., Manion, L. & Morrison, K. *Research Methods in Education* (Routledge, 2000), 5th edn.
38. Braun, V. & Clarke, V. Using thematic analysis in psychology. *Qual. Res. Psychol.* **3**, 77–101, DOI: [10.1191/1478088706qp063oa](https://doi.org/10.1191/1478088706qp063oa) (2006).
39. Brynjolfsson, E., Chandar, B. & Chen, R. Canaries in the coal mine? Six facts about the recent employment effects of artificial intelligence. https://digitaleconomy.stanford.edu/app/uploads/2026/08/Canaries_August2026.pdf (2026).
40. Devlin, K., Stilgoe, J., Orchard, D. & Oriane, P. AI: the growing UK pushback. https://kclpure.kcl.ac.uk/ws/portalfiles/portal/380083322/DFI_AI_Pushback_Report.pdf (2026).

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Author contributions statement

J.G. conceived the study, while N.W. and R.H. conducted the study and led in the analysis of the results. All authors wrote and reviewed the manuscript.

Data availability

Due to the sensitivity of interpersonal relations and AI-use disclosure, recordings and transcripts of the focus groups are not publicly available. De-identified theme-based analysis materials may be requested from the corresponding author, subject to ethics approval.

Declarations

Competing interests

The authors declare no competing interests.

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