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Student perceptions on the impact of AI on their teaching and learning experiences in higher education

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Abstract

This paper provides evidence of student perspectives of Artificial Intelligence (AI) in Higher Education (HE). In contrast to the extant literature that uses large-scale survey data to gather the student voice, research methods that prioritise qualitative data collection are presented. The data responds to a gap in the empirical evidence, redressing the lack of qualitative data on students' thoughts and feelings in response to AI within a UK context. The paper also compares categorisations of concern relating to AI in HE between that published by academics and that generated by students using their own frames of reference. Recommendations for HE institutions are provided in response to issues identified in the literature and the research data.

Keywords: Artificial intelligence, Student voice, Qualitative research, Higher education

Introduction

In the 2022 Artificial Intelligence in Education (AIED) conference, social scientist Wayne Holmes convened a panel entitled, "AIED: Coming of Age?" to provoke introspection on the event topic. Holmes argues for a shared and emergent education community responsibility to address implications for the use of AI, partly prompted by the growth in use of ChatGPT and, given its historic expertise in this field, AIED's resultant increased public profile (Holmes, 2024). AIED represents a long-established research and development area with significant global revenue and widespread adoption in HE institutions. In on-site and blended-campus universities, AI technology is used to add capacity to support services (Berry, 2019), complete and automate administrative tasks



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(Abdous, 2023; Bailey, 2020), or support specific skills development for students, such as writing (Kim & Kim, 2022). Similarly, in online-only learning, automating assessments, supporting learning resource provisions, improving the learner experience, and, most dominantly, using predictive models powered by AI have all become widespread (Ouyang et al., 2022). Many scholars predict that AI will “become a norm in every aspect of higher education”, but this trend has not occurred without scrutiny (Fourtane, 2021). The literature explores several risks to staff and students because of AI use. This includes issues with data protection, ethical concerns, copyright breaches, algorithmic bias and the depreciation of teacher/student interactions (Klutka et al., 2018; Newton, 2021; Petersen & Batchelor, 2019; Selwyn, 2019; UCU, 2020; Williamson, 2017; Zeide, 2019). AIED is criticised “for perpetuating poor pedagogic practices, datafication, and introducing classroom surveillance” (see Holmes, 2024).

Despite both widespread adoption and concern, prior to 2023 there are few initiatives to develop clear policy for AI’s use and implementation in the HE sector. Since 2023, however, this has changed radically, with a proliferation of dedicated events seeking to produce guiding resources for teachers. For example, the SEDA ChatGPT seminar series (SEDA, 2023), the Generative AI Conference for Hong Kong Higher Education (GAIN, 2023), the Australian Government’s guidance on AI for tertiary education (TEQSA, 2023), the recommendations published by the USA’s Department of Education (Cardona et al., 2023), and UNESCO’s (2023) global guide for HE. In the UK, the Russell Group (2023) (representing twenty-four large universities) produced a three-page principles document on generative-AI prioritising AI-literacy, support for appropriate student use of AI, ethical adaptation of AI into assessment, AI and academic integrity, and sharing best practice across the sector. The document draws on work undertaken by the QAA (Quality Assurance Agency) and the Department for Education. Increased impetus for generating meaningful policy around AI’s use came shortly after the November 2022 release of OpenAI’s ChatGPT which facilitated greater access to and awareness of generative AI in the public consciousness.

Even the founders of OpenAI note the need for caution “against the hype” for such tools (Rudolph et al., 2023, p. 342). Fervent HE response to AI from 2022 exposes a shift in access to and power of AI tools, particularly access by students that may change their learning experience. ChatGPT is often discussed in the media as the focus of AI discussions, but is not the only interactive, large language model (LLM) generative AI capable of a discursive interaction with a human operator. Other products such as Google’s Bard and Microsoft’s BingChat (based on GPT4 LLM) are just some of the tools available in this space. These tools are not static either, as they are constantly updated through successive versions. There are also differentials between free and pay-to-access tools. Likewise, AI includes a plethora of non-LLMs, including image-based and code-based tools. New

AI-fuelled tools are constantly emerging as the technology industry gestates and releases apps that reimagine AI in different contexts. AI is not one thing but a myriad of new technologies that map onto the desires of the human imagination and the demands of industry. Every step change for AI has the potential to impact the education sector dramatically. With such swift technological leaps, it becomes increasingly difficult to stay up to date with practice and policy.

Each of the implementations of AI in HE institutions discussed above fit within the five key uses identified in a global review of peer-reviewed publications from 2016 to 2022: assessment automation, evaluation, and feedback; predictive models covering topics such as satisfaction, career choices, and academic performance; AI assistance with student support services, outreach, accessibility, and chatbots; intelligent tutoring systems; and managing student learning (Crompton & Burke, 2023). What is noteworthy about each of these uses is it assumes an institution-led, institution-managed and, in many instances, institution-focused application of AI as part of “an offering to students” (Otero, 2023; see also Holmes & Tuomi, 2022). Consultation with students on such uses, student agency, and active benefits to students are muted in such contexts. The free, public release of ChatGPT reversed this tendency towards students’ active engagement with AI (and AI issues) in HE.

Student views on AI in HE

Evidence on student perceptions and use of AI in their learning is limited compared to that of staff. In their review of news articles and higher education responses to ChatGPT, Sullivan et al. (2023) note that the student voice is virtually absent from this discourse. Given the recent development of accessible AI software tools for the general public, it is not surprising that the literature is limited on this topic.

Some studies focus on how HE uses AI as a support tool. This includes university’s successful implementation of study support chatbots that received positive student feedback (Chen et al., 2023; Essel et al., 2022). One study demonstrates that students make assumptions about AI in relation to its perceived lack of creativity, though it is seen as holding the potential to support users’ creativity (Marrone et al., 2022). Another study on the use of the academic writing aid Quillbot shows that postgraduate students perceive that their experience using the tool are effective and positive (Kurniati & Fithriani, 2022).

Overall, very few studies use qualitative approaches to glean student perspective on AI in HE. Those studies that do exist are typically limited to a single subject area and often use mixed methods approaches that preference quantitative datasets (e.g., Belda-Medina & Kokošková, 2023; Erito, 2023).

Most research on student views on AI in HE is gleaned from large-scale survey data. A selection of international examples is provided to indicate global student perspectives of

AI in HE (see also research in the Philippines by Obenza et al., 2023; in Afghanistan by Fazil et al., 2024; in UAE by Calderwood, 2024).

A survey of 399 students in Hong Kong provides insights on student use of generative AI, noting that some 70% have used AI at least once, 10% use it frequently and 6% always use it (Chan & Hu, 2023). This study also demonstrated that students see the benefit of AI to support them broadly with quick response times and administrative tasks, in addition to direct study benefits such as research, writing and data analysis. Several concerns are raised by students too, notably AI's inaccuracy, competency and values, career impacts, and ethical issues on privacy. While many students surveyed consider themselves knowledgeable on AI and its limitations, the authors note that students may overlook the significance of AI's lack of empathy and emotional intelligence (Chan & Hu, 2023, p. 8).

Another large survey of 682 Business Management students in India demonstrates positive response to the use of AI in HE (70+% positive in relation to general use in academia, teaching and learning, academic administration) with negative alignment to its use in examinations, placements and admissions (Kumar & Rama, 2022).

Petricini et al.'s (2023) online survey of 380 students at one large USA university demonstrates interest in AI alongside wariness in its potential to breach institutional policy. Students were aware of AI but were reticent in their expressed proficiencies with the technology, and were neutral in their planned future use of AI to support their studies.

The USA-based Best Colleges organisation ran a similar survey of c.1,000 undergraduate and postgraduate students (Best Colleges, 2023). Some 22% state that they use AI software in their assessments while 43% have used it in some capacity, while 31% note that any use is banned by their institution. Future-thinking questions demonstrate that 57% do not ever intend to use it, 27% are concerned with the impact of AI on education, 31% are concerned about impacts on their careers, and 61% believe that the use of AI software will "become the new normal".

Perceptions of AI by students in specific disciplines are discussed in a small number of studies that, again, typically use quantitative survey data approaches. The views of 484 medical students at nineteen UK schools demonstrates that students lack confidence in engaging with AI tools, desire more engagement with AI within their curriculum to support their future career ambitions, and the majority believe they understand the limitations of AI (Sit et al., 2020; see also comparable subject studies in the USA and Canada from Wood et al., 2021; Teng et al., 2022). An Indonesian study on English language student perceptions of AI shows that students believe that AI supports their learning across a range of language-based areas including grammar and the writing process (Enzelina et al., 2023; see also comparable subject studies in Vietnam from Phan, 2023).

The methodologies typically chosen in these studies are limited by the questions posed by researchers. These questions create fields of inquiry that are determined by researchers

from a staff or institutional perspective rather than areas of concern delineated by students. As such, a gap in the literature demands research into student perspectives on AI in HE framed by students' terms of reference.

Rationale for this study

Any student can now access AI technology in much the same way as their institutions, such as to maximise efficiency of their productivity, and to support their learning in a variety of ways. They can also do so without the consent or beyond the control of the university they study in. One may argue that it is this redistribution of access and power that has prompted a moral panic amongst (some) universities around the world in a manner similar to the reactions to the democratisation of internet access in the 1990s. Reactionary, top-down policy that seeks to police and subdue student use of AI in their studies may be ineffectual, given students' unmonitored access to AI tools via their personal devices. Other means of controlling use of AI, such as use of AI detection plagiarism tools, are somewhat limited in their proposed success and may present a financial burden for institutions. A disclaimer in OpenAI's detection software notes that "it is impossible to reliably detect all AI-written text" (Kirchner et al., 2023), a claim supported by academic research (Sadasivan et al., 2023). It is also difficult to plan and mitigate issues on AI in HE, or support engagement with AI, without first understanding student perspectives.

To redress current concerns on the use of AI in HE demands the involvement of students in the creation of policy and in teaching and learning practice. This is the central contention of this research and the justification for its empirical, social-science methodology. The challenges to educators include how to guide learners on principles for engaging with AI and how to defend against its pitfalls. Some students are users and innovators of AI, some may know nothing about its potential, while others may have concerns or fears about any engagement with it. Inviting student views and experiences into the AI conversation ensures that all decisions respond to the views and needs of those who may be most impacted by any changes to policy and/or practice in HE. Given the existing reality or potential for students to encounter AI, including via their studies or support services, the imperative to understand the student experience becomes clear.

This article responds to a gap in the empirical evidence, asking what students think and feel about AI and its impact on HE in the UK context. The following interrelated research questions are posed:

- What are student opinions of student use of AI in HE?
- What are student experiences of using AI in HE?
- What is students' knowledge of AI in HE?
- What are students' view on the administrative, technical and teaching use of AI in HE?

- How do the range of AI in HE matters expressed by students compare to the extant categories determined by staff?
- How can students' opinions of AI in HE inform decision-making?

The overarching question is, therefore, *what can qualitative evidence on students' views on AI in HE contribute to the current literature and decision-making in HE?* The objective is to use research methods to ascertain student-driven concerns about AI in HE and ensure the student voice is framed by students' terms of reference.

This paper presents evidence from both qualitative focus groups discussions and a subsequent qualitative and quantitative survey of these same students. Qualitative methods for data collection are prioritised, in comparison to previous research using large-scale quantitative data collection, to enable frames of references determined by students to be delineated. The analysis compares student-determined priority areas to those already identified by staff in the literature. The study thereafter identifies a series of recommendations for the HE sector.

Methods

Focus groups were determined to be the best method by which to gather qualitative data on student views of the impacts of AI in HE. Group discussions enable students to speak candidly and informally in a group setting. Limitations of focus groups include the issue of some students not airing their views, perhaps feeling overwhelmed by the group setting, or some students becoming dominant voices at the expense of others. To redress this issue, the focus groups were (a) designed to facilitate individual data capture, and (b) supplemented with an online survey using both multiple choice questions and free-text prompts.

At the recruitment stage, students were asked for their year of study, the school in which they study, and if they are international or domestic students. This data provided the researchers with an indication of the breadth of representation from the student body. Such demographic data points were not, however, recorded within the data collection phase, as the researchers believe that such identifying data might cause the students to feel their responses were monitored and might induce anxiety over discussions of AI-related plagiarism. Personal information such as gender and race/ethnicity was not collected, though the researchers observed a balance of representation emerged across all focus groups.

Questions and prompts included in the focus groups and online form were co-produced by the lead researchers in consultation with colleagues specialising in delivery, training or policy relating to AI in teaching and learning. Additional considerations were drawn from the literature. Sullivan et al.'s (2023) categorisation in their analysis of ChatGPT discourse provides a useful reference point in the development of empirical data for use in HE. These

categories were adapted and thereafter developed for consideration in the research (Table 1). Focus group and online form prompts and questions derive from considerations included in Table 1.

Due to logistical constraints, focus groups were limited to one hour each. As a result, not all categories could be included. The most important areas for discussion were decided following review with internal stakeholders and determined as benefits, risks and policy (see Table 2).

The “warm up” activity allowed students to be occupied when arriving early or waiting for late comers. It also facilitated the collection of unfiltered views pre-discussion. The

Table 1 Categories of concern regarding AI in HE

Category	Explanation
Personal experience	Students’ use or avoidance of AI; students’ emotional response to AI
Academic honesty	Student views concerning cheating (their own cheating, cheating of others, repercussions for cheating)
Curriculum change	Student views on how the curriculum: is changed in response to AI (e.g., changing assessment design); can be designed by AI
Limitations	Student views on the limitations of AI (e.g., accuracy, false data results)
Benefits	Student views on: the benefits of AI (e.g., summarising articles, providing draft outlines); how AI can be appropriately incorporated into their learning experience; how AI can support accessibility and widening participation in higher education; how AI can be incorporated into different disciplines (e.g., coding, writing)
Risks	Student views on how AI may: negatively impact their learning experience; decrease/jeopardise the external value of their degree; disenfranchise certain demographics
Policy	Student views on how University should: devise policy on AI in higher education for staff and students (including guidance for both parties); communicate any such policy on AI
Career concerns	Student views on the drivers to engage with AI in order to prepare for future careers; student views on employer expectations relating to AI
Personal experience	Students’ use or avoidance of AI; students’ emotional response to AI

Table 2 Focus group prompts

Focus group category	Prompts on student views
Unspecified warm-up activity	List three ways that AI can impact higher education.
Benefits	Suggest any ways that AI can improve learning in your degree studies. Write down three positive things about AI tools in relation to assessments in your degree.
Risks	Suggest any ways that AI can result in risk to learning on your degree. Write down three negative things about AI tools in relation to assessments in your degree.
Policy	Policy is a plan of what to do in certain situations, or a set of agreed ideas about a topic. List three policies that the University should adopt in relation to AI.

focus groups format thereafter consisted of: (a) researcher presents prompts to students; (b) students reply to the prompt with a group discussion; (c) researchers distribute three blank notecards to each student, instructing them to record their top three most important responses to the prompt; and (d) students collectively pass their handwritten responses to the researchers. This format was repeated for the three focus group categories in order (Table 2). The group discussion allowed students to share their own views and hear the views of others, some of which might be novel to the students, and then choose how to individually respond to the prompt using the blank notecards. Incidental observations on student-led freeform discussions were also noted by the researchers to ensure that all observations were fairly captured.

Student names were never requested, recorded nor required in relation to their responses during the focus groups, to support the anonymous nature of the data collection. Any identifying data collected was removed before analysis occurred.

Qualitative analysis of the focus group data (captured via notecards) was undertaken using a QCSR (qualitative case study research) approach, a form of thematic analysis similar to that developed by Braun and Clarke (2006) and Watts (2014). Using this method, a researcher reads through all responses in a given category several times to ascertain general themes that emerge from the data. This is in opposition to a researcher already having set themes that they then use to categorise responses. Using QCSR, the data is analysed on its own terms, rather than being guided by external terms of reference. QCSR is an appropriate tool to categorise the descriptive and latent issues drawn from students' responses.

This research followed the approach of Mishra and Dey (2022) and data was subsequently represented in an adaptation of Gioia et al.'s (2012) work on structuring data from themes to concepts, allowing for inductive analysis before subsequent convergence with the literature. Following the approach of Mishra and Dey (2022), on the first level of theme development, open coding was used to initially identify key terms within the data. At a second level, further codes were analysed for significant elements. The third level allowed for convergence with other data and themes identified through the literature. The use of a data structure table was used in an adaptation of Gioia et al.'s (2012) work on structuring data from themes to concepts to help organise this analytical process. Part of this process emphasised the suggestion of Ryan and Bernard (2003) to identify repetitions of words or phrases as this was appropriate for the format of the data collection.

Results

Demographics

Of the sixty-seven workshop attendees, student demographics are skewed towards Arts (19%), Social Sciences and Law (28%) and Life Sciences (36%) with only a small number of students from Science (10%) and Engineering (6%). The majority of students are post-graduate taught (38%) or post-graduate research (23%) while undergraduate representation is strongest for third year undergraduates (18%). Most participants are international students (62%). The high inclusion of international students and PGT students, and low inclusion of undergraduate students, is likely caused by the time of year (June/July) when undergraduates are undertaking exams or away from campus, while PGTs are largely still on campus.

Focus groups: thematic analysis

Thematic analysis articulates defined topic areas produced by students attending the focus groups, as recorded on notecards. Topics are almost exclusively unique to correlation with positive or negative responses to AI, or to considerations for policy decisions. The only topics that overlap in both positive and negative areas are equity and graduate skills. Data is presented in Table 3 and includes an explanation of each topic. The term “mention” indicates an instance of a topic being written by a student; students sometime included multiple topics in one sentiment. Topics with less than ten “mentions” across the data are excluded.

The most frequently mentioned positive aspect of AI is academic support, with 126 instances of this topic recorded. Students also note that reading, writing, enhanced learning and efficiency gains are significant. Likewise, equity matters significantly to students here. With regard to negative associations with AI, students are concerned with issues of academic integrity, misinformation and (in)equity. They also note issues with how AI will impact their ability to learn and be creative. Beyond individual experiences, students raise concerns with how AI will impact HE in general and the purpose of learning, alongside concerns with how AI might impact wellbeing. In response to what steps their university should take next (policy), students believe the institution needs to provide strong leadership and direction alongside clear guidance and AI-literature pedagogy. They note the importance of quality assurance considerations. Assessment is a specific focus in relation to the curriculum.

When discussing the benefits of AI use, students’ perspectives pivot on the pragmatic, logistical aspects. This centres on notions of what AI can ‘give you’ and how ‘it’ functions in relation to streamlining and efficiency. How AI can help structure students’ engagement with their learning is a repeated thematic prioritisation. Students value how AI can provide

Table 3 Thematic analysis of focus group data

Topic - Positive	Explanation	#mentions
Academic support	Support for students' independent study skills	126
Efficiency gains	Allow students to prioritise aspects of their study	46
Writing	Support for writing	40
Enhancing learning	Perception of improving the quality of students' learning experience	36
Reading	Support in understanding academic reading	32
Equity	Concerns about the ethical aspects of AIED	28
Providing feedback	For self-assessment purposes	28
Self-efficiency	Allow students to improve their independent study skills and self-evaluate	16
Improving administration	Organisational, practical benefits separate to learning and teaching	14
Pastoral support	Provide reassurance in response to study anxiety or stress	14
Topic – Negative	Explanation	#mentions
Academic integrity	Concerns around perceived lowering of standards	77
Misinformation	Concerns over use of inaccurate or misleading information	45
Equity	Concerns about the ethical aspects of AIED	44
Instrumental learning	Concerns students focus on surface-learning, i.e., sifting sources but not reading critically	39
Loss of criticality	Absence of evaluative skills/higher order thinking	37
Loss of creativity	Concerns around originality and novelty of thought and production	33
Change to status quo	Concerns around existential aspects of HE	25
Wellbeing concerns	Concerns around mental health and wellbeing connected to AIED	20
Re-prioritisation	Change in students' learning orientation/purpose of HE	16
Topic – Policy	Explanation	#mentions
Institutional	Indicative of the need for action taken by the University of Bristol	134
Guidance	Implication of information sharing and advisory elements	65
AI-pedagogy	Indicating training and learning on best practice around AI use	35
Quality assurance	Indicating a need for regulation of assessments and outcomes	26
Assessment-design	A focus on developing assessment-design in response to AIED	22
Resourcing	Provision of physical or digital resources to improve AIED	19
Teaching and Learning	Indicative of responses to AIED effectively managed through teaching and learning experiences	14
Curriculum design	Addressing AIED through enhancement of curriculum design	10

templates or foundational materials on which to develop their own ideas and responses with commentary on the benefits and accuracy of this service. For many students, AI is predominantly conceptualised as a support tool. For one student, this meant that 'things aren't quite so overwhelming'. Some students use AI to gain feedback or prompts in preparation for assessments. Here, AI is a useful as a tool for academic support and assurance.

A theme of mistrust or apprehension about the outputs permeated many of the students' comments. Concerns included the risks resulting from perceptions of the shallowness or limitations of the technology, and varying levels of trust in its validity and accuracy. Students typically reflected on concerns around integrity and the ambiguity between AI as a learning tool, as a method of completing assessment and the institution's balance between what was seen as somewhat separated realms.

Students also explored the disempowering potential of AI. One student identified this as 'you are doing less, so your brain is not working, and you are getting less bright'.

Student discussions also express elements of moralistic tones. The theme of laziness was one which featured in much of the discussion. For many students this reflected their perceptions of the volume of time spent studying as a marker of their level of understanding and engagement. Previous themes of efficiency and streamlining were therefore also seen as set against an imperative to labour in their studies.

Focus groups: incidental observations

Students asked the researchers questions during the focus groups. When asked what defines or "counts as" AI, researchers attempted to steer the question to the group, soliciting answers from the students rather than the researchers. When asked for an example of AI, the researchers elected to name the most contemporaneously famous AI, ChatGPT. When asked if AI only included generative-AI or also coding, the researchers stated that all AI was included in the study. When asked what the university's position on AI is or what provision the university provides on the topic, the researchers provided that information at the end of focus groups after data collection. The researchers also communicated that their replies were purposefully vague so as to not bias the dataset.

Many students expressed anxiety regarding the (post-pandemic) return of in-person long-form exams, noting that they are stressful. While students noted the potential for some assessments to facilitate easier cheating with AI, they noted that redressing this problem should not require a return to such exam conditions. A small number of students adamantly supported exam conditions as the only means by which to completely bypass the ability to cheat using AI.

Students were very interested in how AI detection results appear to staff. They related this to how "plagiarism detection" works and were curious as to how staff view and understand these results, noting that communication from the university on how this operates would support confidence when submitting written assessments or coding results.

Focus groups enabled students from different faculties to interact and discuss their experiences. The researchers observed that disciplinary differences between STEM and other subjects are emergent in relation to pedagogic and subject norms. Students articulated

the result of this requires different forms of communicated guidance and assessments for different subjects.

Some students articulated disdain for any ban of the use of AI. Discussion comments included steers for the university to avoid using fear tactics or outright bans as they will be ineffectual. One student verbalised this as: “The toothpaste is well out of the tube. It’s absurd to be told not to use it the same week we were taught about it”.

Some students noted an emergent existential dread because of AI, asking what is the point of HE given what AI can achieve and replace? This dread includes questioning the virtue of degrees, the merits of HE in general, and the ultimate utility of humankind. Students identify that some subjects/industries will be impacted by AI more than others, with one stating “you need to be more skillful to beat AI”. Worries or dreads about how AI will further erode space for human interaction were also mentioned.

In several groups, students articulated how disagreements on the use or non-use of AI occur frequently within cohorts and amongst friends on different degree programs. In such cases, unease, confusion, differential guidance, and different perspectives on the use of AI are enflaming friction within the learning community.

Outside of HE contexts, students note their use of AI in many personal venues, such as cover-letter writing, replying to emails, holiday planning, and lifestyle scheduling.

Issues of bias in AI datasets were mentioned by only two students, one of whom is an advanced user of AI. No students discussed environmental issues relating to AI.

Online form

When asked about previous experiences, 79% of students state that they already used AI to support their studies. This use is clarified into subcategories: to improve or plan written material (37%); to conduct research (21%); revision planning (16%); to write material for a submission (8%); to respond to an exam question (8%); and to prepare code (8%). Of those who have not used AI (13%), the reasons for this include: a personal or moral objection; a lack of understanding of the tools available; concern relating to academic penalties; and a lack of disciplinary applicability. A further 7% of all students in the study tried to use AI unsuccessfully with reasons including a dislike for what AI produced, a lack of knowledge in the use of AI, and a lack of disciplinary applicability. When asked if they plan to use AI in support of their studies in the future, 56% state yes, 36% are unsure, while 8% state no.

ChatGPT was the most frequently cited AI tool used by students who specified this (n=54). Other tools used included Quillbot (n=5), Google’s Bard (n=5), Grammarly (n=4) and Github Copilot (n=2). Singular references were made to both AI and non-AI tools including PaperDigest, Claude, Dall-E, Whisper, Elicit, Red Book, Alphafold2, Elite, Goblin Tools, Slides AI and WordTune.

Under the themes of accessibility, widening participation (WP), equality, diversity and inclusion (EDI), students were asked if AI could positively benefit any group or demographic of student with 50% stating yes, 30% maybe and 20% no. Regarding WP, many students lacked confidence or familiarity with this topic. Suggestions for consideration included conflicting views on how AI may: increase or decrease inequalities; improve access to information and support services; and support those with disabilities. The majority of responses related to how AI can support learners for whom English is not their native language. Several students noted that inequalities could be increased due to unequal access to paid-for AI services.

Students were prompted to consider if any aspect of their teaching and learning should change in response to AI. Just 3% of students believe that nothing should change, 28% believe how assessments are designed and conducted should be updated, while the remainder of students (69%) believe that other aspects of design and content of curriculum should be altered. Most students (86%) express concern that AI may impact academic integrity in assessment. Almost all students (60/67) responded to the query on “What, if anything, should change about teaching and learning at the University in response to AI?” with 35% identifying assessment. Concerns about assessment were largely unspecified, but some students indicated that assessments should engage with critical thinking, skills and creativity to avoid plagiarism if using AI. Other matters raised included fairness and equity. Some 23% of students believe that the university should provide training and education on the appropriate use of AI, in support of both studies and long-term career readiness. A further 16% prioritise educational content with mixed views on what this might look like, such as simplifying content, tailoring content for individuals, increasing creativity and engagement, and increasing support.

Students were also asked if any part of their degree programme should be designed or managed by AI, with 36% responding positively, 27% negatively and 37% stating that some elements of the suggestion could be considered. The majority (63%) of students believe that there is an appropriate way to incorporate AI into their learning experience, while 9% are opposed and 28% are unsure. When prompted to reflect on what this might look like, students suggest administration tasks such as timetabling (25%), content prompts (12%), curriculum design (7%) and student support services (7%) including chatbots, tutoring, and writing. Of those opposed to the use of AI in this context, reasons included unreliability and a lack of *humanness*.

When asked about AI marking their work, 80% of students are opposed to the idea with some allowance for MCQs (multiple choice questions). Students responding to “How would you feel if your work was marked – in part or in full – by AI?” use words such as *horrible*, *outraged*, *uncomfortable*, *worried*, *disappointed*, *annoyed*, *unwilling* and *unhappy*. Those who responded positively noted the potential for AI to be used while

moderated by humans and the benefits of saving time for assessors. Negative feelings are more muted in relation to use within the confines of administration, such as timetabling, wherein most are ambivalent.

When asked about cheating, 8% of students admitted to using AI to knowingly contravene academic integrity. When asked what the University should do in response to cheating by using AI, 44% of students call for further guidance from the University, with or without any further action. Other suggestions include equivalent penalties as with any form of plagiarism (23%), increased checks on submissions via AI detectors (11%), and a multi-stage warning system (11%).

When asked “Can the use of AI within a degree programme risk the perceived value of that degree programme to potential future employers?” 53% said yes, 35% were unsure and 12% said no.

On whether AI-related skills are important to future employers and careers 62% said yes, 27% said maybe and 11% said no. Most students identify an inevitability of the current or future use of AI in the workplace. Some students are enthused by the prospect of increased productivity, while others are more resigned to this perceived eventuality and feel they must accept it and, therefore, be suitably skilled for such contexts. Many students express unease and a lack of certainty of what future workplaces featuring AI will look like and how their careers will be impacted.

Limitations

The study reflects the views of a limited number of students in one UK university and, as such, may not be representative of all student views. This is exacerbated by the demographics limitations that exclude or near-exclude some subjects institutionally.

The data collection methods limit correlation between students’ demographics and their responses, thus limiting the identification and analysis of perceptions within different demographic groups. The authors assert that this point of methodological compromise matches the ambitions to facilitate student ease within focus group discussions and potentially reduced the risk of student reticence to be honest in their responses.

Responses to student questions during the focus group discussions that were answered by the researchers may bias the research.

While every effort is made to represent the data fairly, the authors note that all analysis is open to a variety of interpretations.

Discussion

When student views (derived from the focus groups) are mapped against the categories of concern drawn from the literature (Table 1) they match well (Table 4). Overall, the categories identified in Table 1 may be taken as accurate and fit for purpose suggesting

that staff and student areas of concern relating to AI are in alignment. The only area excluded from the mapping is student articulation of concerns relating to their careers and future employment. This gap may suggest that students are focused on immediate concerns relating to AI, rather than longer-term issues. The gap may also exist due to the framing of discussion questions that specified HE matters only rather than anything explicitly relating to employers.

The research data demonstrates a more refined categorisation of student prioritisation and emotional sentiment towards AI that enriches understandings gleaned from extant literature (Table 4). For example, the negative correlation column indicates categories where student anxieties may be most focused (e.g., wellbeing, academic honesty, how the curriculum may be revalued through re-prioritisation). Higher Education providers may wish to ensure robust communications and support on these specific matters to alleviate confusion and anxiety. It may be inferred that less support is required in areas where students already identify positive benefits to AI. Another example is the clarity of where students believe their university should be responsible in relation to AI. Under the policy category, decisions and changes to the curriculum are paramount alongside quality assurance and guidance.

Table 4 Categories of concern regarding AI in the literature mapped against students’ views

Academic Research categories (Table 1)	Student focus group categories (Table 3)		
	Positive	Negative	Policy
Personal experience		Wellbeing concerns	
Academic honesty		Academic integrity	
Curriculum change		Re-prioritisation	AI-pedagogy; Assessment design; Teaching and learning; Curriculum design
Limitations		Misinformation	
Benefits	Academic support; Efficiency gains; Writing; Enhancing learning; Reading; Equity; Providing feedback; Self-efficiency; Improving administration; Pastoral support		
Risks		Equity; Instrumental learning; Loss of criticality; Loss of creativity; Change to status quo	
Policy			Institutional guidance; Quality assurance; Resourcing
Career concerns			

AI & cheating

Student concerns relating to AI and academic integrity are significant. The data articulates fears of penalties for using AI, concerns regarding assessment integrity, and emergent social discord. Some 8% of students believe they have used AI to cheat in some way. Whilst the topic of contract cheating and AI was not a core focus of this study, it is an important aspect of concern for academics, policymakers and students. The limitations of this study in relation to AI-enabled cheating underscore the scepticism on the validity of comparable approaches and results in the literature (see Krásničan et al., 2022, p. 30). It is possible that instances of wilful contract cheating are under-reported. There is scope for future research into the level of AI-enabled contract cheating employing more suitable methodology. Any such research should note that results may be outpaced by the speed of technological advancement and the underlying reasons for contract cheating are unchanged. The response to AI-enabled contract cheating may not lead to conceptual changes on effective current practice (see Harper et al., 2019; Krásničan et al., 2022; Wang & Xu, 2021) that focus on detection, regulations and policy, assessment design, staff development and student education (QAA, 2022). Existing measures may at most require extension and adjustment to combat increases in contract cheating.

Detection is a subset of concern for both students and HE providers. The QAA notes that detection can serve as a deterrent (QAA, 2022, p. 2). The use of AI detection can, however, provoke unease amongst the student population as evidenced in the data. Student concerns are reasonable considering, for example, the limitations of AI detectors and their error rates (OpenAI, 2023), such as Turnitin's admitted 1% error rate (see Turnitin, 2023; Webb, 2023). Students' anxieties, fears and misunderstandings also reveal the need for clear communications about the use and nature of such software. For HE providers, AI detection software (provided by, for example, *SafeAssign* and *Turnitin*) are limited in their accuracy and can provoke controversy. Therefore, HE providers should recognise both AI detection software and comparison checking software as limited in their accuracy, validating some of the unease students and some staff feel. In both instances, there are many general misconceptions amongst students, with many referring to "plagiarism detection" and over-estimating the efficacy of AI-detection. Both software services offer comparison checking rather than "detection", checking submissions against other reference material. Comparison checkers provide no means for detecting newly written material, generated by humans or AI, whilst AI checkers are very limited in their application across all disciplines and modes of written assessment. Turnitin also limits the ability for providers to "opt-out" of certain options and functionality (see Cassidy, 2023; Knox, 2023). Outcry from the sector prompted revisions to these option limitations with some HE providers stepping back from trialling such products (Staton, 2023).

Whether universities adopt or reject the use of a software solution for AI detection may become a point of reputational importance for HE institutions, especially given the infancy of the software and legitimate questions regarding its efficacy, its potential lack of parity in its assessment of different forms of writing, its assessment of submissions by neurodiverse students, and questions around data retention.

Guidance and communication

Many students expressed a lack of clarity regarding university policy on the use of AI in relation to their teaching and learning experiences. There is confusion on how AI may be used appropriately, where its use is proscribed, and how it may benefit or hinder students' studies. This lack of information has wide-reaching implications, leading to peer-to-peer social conflict, and disparity in understandings and interpretations of often widely opposing advice from staff. Some reported being told that no use of AI was permissible and that any use would be captured (often through software) and penalties imposed, whilst others reported being encouraged to use and explore the technology, provided they did not contravene academic integrity regulations. Very few reported any communication regarding the potential issues of bias that may arise from using generative AI or how they should cite any use of AI in their work.

Clear communication is essential. Indeed, clarity on policies and practice are viewed as a minimum standard of practice by the QAA (2023, pp. 2-3). Despite this evident need, a recent UNESCO global survey of 450 educational institutions (primary through to tertiary) identified that less than 10% had developed any formal guidance or policy to address student concerns on the use of AI applications (UNESCO, 2023a). The data presented above echoes the gap in communication identified by students, with 44% of students calling for guidance from the university. This lack of awareness and, in part, lack of policy is itself a contributing factor in academic misconduct, as noted by the QAA.

Curriculum change

Students in this study consider curriculum change an essential response to growing use of AI in teaching and learning contexts. Students do not necessarily offer specific solutions to what such change might look like in practice but do identify change is needed across the spectrum of teaching and learning activity, such as curriculum content, academic honesty, AI-pedagogy and assessment design. For many education technologists, AI cannot practically be banned and instead AI should be appropriately integrated "in an informed, and responsible way" (Bowditch, 2023). Any such changes may redress several problems simultaneously and bring welcome improvements to programmes.

Most students consider that AI will play a significant role in their future careers, though they do not specify what form it will take. This view is reinforced by the QAA, who note

that “employers will expect (and value) graduates to be familiar with Generative Artificial Intelligence tools when they enter the workforce”, including ensuring they are “aware of the limitations of these tools” and have a broad knowledge of appropriate ethical applications (QAA, 2023, p. 3). Ensuring students know how to engage with AI is, therefore, not just a concern for student experiences of teaching and learning directly, but also an expected skill many will require as graduates.

Combining this need to equip students with the skills and knowledge to use AI and, to a lesser extent, concerns around academic integrity, one possible focus for assessment reform could be toward so-called “authentic” forms of assessment (QAA, 2023, p. 2). The use of authentic assessment to reduce instances of contract cheating is widely lauded, although some have contested its efficacy in practice (Elis et al., 2020). Authentic assessments may have a place in a reformed, AI-responsive assessment strategy. They draw together the concepts of knowing and doing, effectively asserting “knowledge as an integral, self-sufficient substance, theoretically independent of the situations in which it is learned and used” whereby assessments must evaluate knowledge and skills in “coherent, meaningful, and purposeful activities” that have a direct relationship to potential post-educational applications (Brown et al., 1989, pp. 32-34). Assessments that authentically include generative AI in a manner that is directly applicable to a student’s disciplinary interests may provide a degree of protection against contract cheating. Such methodologies will also aid in the provision of employment-crucial skills for graduates (see also Bowditch, 2023). Including AI in an authentic assessment may equip students for *revolutionised* post-graduate employment. It is not, however, revolutionary to assessment and, perhaps, fails to grapple with changes to education that will likely result from the widespread adoption of AI technology (see also Lucklin, 2023; Luckin et al., 2016).

The future for HE

Many students raise concerns about how the HE sector may change in response to the wide availability of GenAI. Certainly, drastic changes are in process and likely to expand. For some students in this study, artificiality acts as a limiting factor for what they see as AI’s benefits or capabilities. Artificiality is, in this context, the antithesis to authenticity – posed, in this paper, as a *solution* to pedagogy for AI. However, what *authenticity* in assessment means is itself likely to continue to evolve and, crucially, not only in response to the contextualised use of AI in a particular discipline or potential career route.

As noted in the introduction, the widespread public access to GenAI represents an inversion of AI’s use and influence within HE. Rather than the institution using AI powered tools and systems to monitor, support and assess their students in the search for efficiency, many students themselves now use AI to ‘efficiently’ respond to assessment tasks, plan and organise their work. If managed correctly, rather than an outcome to be resisted,

students taking this approach could be encouraged. As UNESCO notes, educational institutions should move toward normalising the “use of AI-based tools to minimise the pressure of homework and exams, rather than exacerbating it” (2021, p. 34). With this agenda in mind, the discussion of artificiality arguably shifts toward automation. Using a calculator to compute complex maths is not considered *artificial* or *inauthentic*, but rather an authentic application of knowledge in a changed technological environment. It is probable that, in a relatively short period, the use of GenAI to produce written, visual, and likely aural content will also be seen in this context. However, this is likely to have an impact on the wider knowledge and communication economy and, given the location HE and research establishments have in this economy, training people to use GenAI may not be authentic enough.

Within a short time, universities should begin reflecting on what broader, social and economic changes will unfold, affecting the value of their graduates’ qualifications. For example, it will become vital to consider what constitutes valuable applications of knowledge in a world where communicating and accumulating knowledge is semi-automated. Potentially, this may usher in a shift in the value of knowledge from communication and theoretical development and toward application and development in practice. To equip graduates for such an applied-knowledge economy, assessment reform may need to go beyond the inclusion of GenAI to sustain its authenticity and value, perhaps moving more firmly into vocational applications. Not only is it likely to be vital for the survival of universities and sustaining the value of HE qualifications, there is also a need to ensure that “students’ agency and social-wellbeing” is sustained in such a changed world, maintaining their “motivation to grow as individuals” both within their educational and post-graduate careers (UNESCO, 2023b, p. 25).

Recommendations

Outright bans on student use of AI are impossible to implement successfully, and therefore ultimately futile. Universities should not ban AI when their own systems utilise AI. To do so is hypocritical and erodes trust with students. There is an expectation that universities should model behaviours and standards to which they envision their students will aspire, rather than demand behaviours that the university does not adhere to.

Universities should provide students with comprehensive training on AI. Any training and education on the use of AI should:

- Include content on ethical issues of bias in AI and big data.
- Address existential dread of AI and its impact on society in the short-term and long-term.
- Be regularly updated and undertaken to reflect the fast-changing nature of AI.

- Include how AI detection operates and appears to staff reviewing automated results produced by such software.
- Clearly delineate what AI use is acceptable and/or unacceptable, with possible differences identified for different disciplines.

All such guidance and instruction should be consistently communicated, ensuring that students do not receive mixed-messages or conflicting guidance from different teachers. Likewise, all policy and AI-related matters should be clearly communicated to students.

Universities should liaise with professional accreditation bodies and external employers to delineate what AI skills are preferable or essential for graduate readiness.

Universities should review the appropriateness of summative assessment design. Assessments that require high levels of creativity, critical thinking, participation, and presentation (including audio-visual creation) may be preferable. Authentic assessment design may provide a suitable means to redress AI concerns and problems. Universities may wish to consider how in-person exams have a detrimental effect on some students' wellbeing. In the short-term, assessment design may require considerable continuous change and development, while in the long-term may require a fundamental shift in what is assessed from an ontological perspective.

Universities may wish to consider a multi-stage warning system for plagiarism with AI wherein successive breaches are penalised more heavily and associated with requirements to undertake AI training/education.

Universities may wish to consider providing access to paid-for premium services to their students to redress issues of unequal access to such tools or offer bursary systems to students who may appropriately benefit from such access.

Conclusions

This study demonstrates that students note positive benefits of using AI in support of their studies, such as independent study skills, writing support and overall improved efficiency. Students are also aware of some of the potential pitfalls of AI, such as risks to academic integrity, misinformation and risks to equity and ethical conduct. Students want clear institutional support and guidance in how to use AI appropriate to their context and anticipate a growing need to use AI within their degrees. Incidental observations by the researchers show that students are unclear what defines AI or not, are prone to AI-related anxieties (including the purpose of their degrees) and worry about AI detection processes. Students recognise that AI will be used differently by different disciplines and are resistant to total AI bans.

The findings presented in this paper are supported by thinktanks such as the 2024 report from HEPI that notes widespread use of AI amongst students and equally low satisfaction with the guidance and support they have been offered (Freeman, 2024). The

recommendations reflect those posited by authors elsewhere, notably those referenced above who are creating guidance on AI use and those conducting research into student use and attitudes towards AI (e.g., Chan & Hu, 2023; Petricini et al., 2023; TESQA, 2023; UNESCO, 2023). Validating the assumptions of the wider HE community through direct engagement with both staff and students is an essential step to producing actionable policy that satisfies all stakeholders.

This research considered how students' feelings and experiences around GenAI related to broader, sector-wide concerns and goals, but it is not clear that these goals reflect staff experiences. This could provide a rich next step for future study.

Lucklin's keynote speech at the Cambridge Summit of Education presents AI as the "fourth industrial revolution" and a disrupter to education (2023). She notes a potential change in focus for education and assessment, moving more toward self-evaluative practices (what she calls "meta-intelligence") and evaluations of interactive and affective modes of intelligence (what she calls "social intelligence") (*ibid*). These epistemological concerns, how they play into the contemporary knowledge economy, and – most of all – how these affect the learning experiences of students, their post-graduate careers, and the modes of assessment use to evaluate their knowledge and skills – is a clear next-step in this research. Exploring how GenAI may provide a shift in educational focus toward the development of the social, self-evaluating individual potentially provides an antidote to the existential dread many of our respondents expressed, and may also provide a pathway for teachers and academic staff to examine and develop their own practices.

Abbreviations

AI: Artificial Intelligence; AIED: Artificial Intelligence in Education; EDI: Equality, Diversity and Inclusion; HE: Higher Education; HEPI: Higher Education Policy Institute; LLM: Large Language Model; MCQs: Multiple-Choice Questions; QAA: Quality Assurance Agency; QCSR: Qualitative Case Study Research; STEM: Science, Technology, Engineering & Mathematics; UNESCO: United Nations Educational, Scientific and Cultural Organization; WP: Widening Participation.

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Authors' contributions

Aisling Tierney and Peter Peasey are the co-lead researchers. Both co-designed the research, undertook the data collection together, and co-wrote the paper. Aisling Tierney took lead responsibility for data analysis for presentation, prepared all tables and undertook text editing and preparation for publication. Joe Gould provided research support. He undertook qualitative research analysis of the focus group data, including categorising and sorting data using thematic analysis. He also provided written summaries of this work and contributed comments on the main body of the text and to the preparation of the final text. All authors read and approved the final manuscript.

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Declarations

Competing interests

The authors declare no known competing interests.

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