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Student perspectives on the use of generative artificial intelligence technologies in higher education

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Abstract

The aim of this project was to understand student perspectives on generative artificial intelligence (GAI) technologies such as Chat generative Pre-Trained Transformer (ChatGPT), in order to inform changes to the University of Liverpool Academic Integrity code of practice. The survey for this study was created by a library student team and vetted through focus groups. A total of 2555 students participated in the survey. Results showed that only 7% of students who responded had not heard of any GAI technologies, whilst over half had used or considered using these for academic purposes. The majority of students (54.1%) were supportive or somewhat supportive of using tools such as Grammarly, but 70.4% were unsupportive or somewhat unsupportive towards students using tools such as ChatGPT to write their whole essay. Students who had higher levels of confidence in their academic writing were less likely to use or consider using them for academic purposes, and were also less likely to be supportive of other students using them. Most students (41.1%) also thought there should be a university wide policy on when these technologies are or are not appropriate to use. The results of this research suggest that students require clear policies on the use of GAI and that these technologies should not be banned from university, but consideration must be made to ensure different groups of students have equal access to the technologies.

Keywords: Artificial intelligence, Generative artificial intelligence, Assistive technology, Higher education, Academic skills, ChatGPT, Academic Integrity

Introduction

Due to the changing landscape of artificial intelligence and emergence of new generative artificial intelligence (GAI) technologies such as Chat generative Pre-Trained Transformer (ChatGPT), the current Code of Practice and online tutorial on Academic Integrity at the University of Liverpool was no longer fit for purpose and needed to be updated.

In order to have a student-centred approach to this policy, a project was launched to gather student perspectives on these technologies. The aim was to understand how students are using these technologies currently, whether their confidence in writing has an

impact on their usage or opinions of the technologies, and how they think the university should respond to them in relation to academic work.

Literature review

Academic integrity is defined as "being honest in academic work and taking responsibility" (East and Donnelly 2012). The many facets of academic integrity, from plagiarism to contract cheating, and the associated challenges for both students and educators are well-contemplated within existing literature. Quantitative and qualitive research in this area has been conducted since the early 1900s (Lancaster 2021), with the emphasis of more recent scholarship on academic integrity within the digital age.

Evering and Moorman (2012, p.35) proposed that due to the changing digital environment, the concept of what constituted plagiarism or an academic integrity breach needed "re-examination". Various studies (Howard and Davies 2009; Williams 2007) noted that the increased use of digital tools for information discovery increased the potential for students to misrepresent ideas and information as their own.

Since then, the research around academic integrity has widened, with the emergence of essay mills, bespoke assignment services, peer to peer sharing sites and online paraphrasing tools expanding the debate (Awdry 2020). Awdry (2020, p.231) defines the whole spectrum more broadly as assignment outsourcing – "the act of a student obtaining their assignment from another party". These services have caused problems for universities, who cannot rely on traditional plagiarism screening software to detect submissions written by these applications, and struggle to convey to students what constitutes cheating. As Rogerson and McCarthy (2017) assert, these tools are inherently problematic, as at the core of academic integrity, and indeed academic writing as a skill, is the ability of students to, "rephrase, frame and restate the ideas and intentions of original authors themselves with appropriate acknowledgements of sources". However, research by Harrison et al (2020) suggested that students think there is a considerable difference between paying someone to write an essay for them, and using "study helper" sites where they use materials uploaded by their peers, which they do not consider to be as dishonest and perceive as being lower-risk.

As well as the change in the availability of technologies to university students over the last decade, there has also been a change in the characteristics of the students who are attending university. Generation Z students will typically have been using a range of technologies from a young age, and have different thinking patterns and ways of working compared to generations before them. Poláková and Klímová (2019) state they have a limited attention span and ideally want to read less than 20% of a text and get to the key points as quickly as possible. Szymkowiak et al (2021) agree that this generation are more impatient and lean towards using technologies that provide them with convenience and the ability to multi-task. This lack of patience can encourage cheating, with Generation Z primarily focused on the end result, as opposed to the learning experience. Coupled with an online environment where plagiarism is rife, as Flom et al. (2021) argues, cheating has become a more socially accepted norm.

Amigud (2019) and Amigud and Lancaster (2019, p.102) researched into the reasons why students may seek to outsource their academic work in some capacity. They found that "perseverance was the top reason for outsourcing work", as students

found assignments boring and tiring, and became frustrated with the effort required to complete them. This was followed by "academic aptitude", where students were struggling with the level of difficulty or skills needed to complete the task. Other reasons included a lack of self-discipline and motivation, personal/medical issues, and struggling to balance with other priorities such as work or family. Overall, they concluded that students who used assignment outsourcing services typically reached a point where they considered the "potential benefits of cheating to outweigh the costs" (p.104). Brimble (2016, p.378) found similar reasons, and also stated that dishonest behaviour is increasingly becoming "the norm" and almost viewed as essential to be able to keep up with peers. Bretag et al (2018) found contract cheating to be most prevalent amongst younger students, those who did not speak English as their first language, and those who were dissatisfied with the teaching and learning provided on their course.

Recently, the emergence of free software such as ChatGPT has caused concern amongst universities, with over a million users downloading the software within the first week (Stokel-Walker 2022). Cotton, Cotton and Shipway (2023) are one of the first to explore the potential impact of this, and whilst they acknowledge the issues of potential essay generation, they are clear that there are also opportunities for the use of these technologies within higher education, such as facilitating group work, creating more game-based assessment and even helping staff with tasks such as grading. Javaid et al (2023, p. 11) also considered the potential benefits and noted that Chat GPT can act as a "virtual teaching assistant" in helping students to understand concepts and ideas. Yu (2023) discussed how rather than banning GAI technologies it is essential to educate students on using them in an efficient manner to prepare them for the job market.

Universities currently face challenges in how to incorporate GAI technologies into their curriculums and academic integrity policies. Research into how to make academic integrity policies more useful and accessible to students suggest considering the student voice when developing these policies, working collaboratively with learners to design guidance, and avoiding legal terminology in communications. (Pitt, Dullaghan and Sutherland-Smith, 2020; Sefcik et al. 2019).

It can be seen from this literature review that there are limited studies surrounding GAI technologies, as the focus is predominantly on the problems caused by essay mills and peer to peer sharing sites. There has been little research on student perceptions of how universities should respond to new artificial intelligence and assistive technologies in relation to academic integrity policies and procedures, and as new technologies are constantly emerging and their functionalities are expanding, it can be difficult to stay ahead of these changes. It is, however, apparent from the existing literature that it is imperative to include students, as key stakeholders, in the process of implementing change to policies and procedures. This research project aims to understand current student perspectives on GAI technologies, including: their knowledge and use of these technologies; whether confidence in academic writing affects their use or opinions of these technologies and to discover how students want the university to address GAI technologies in its policies, in order to create a student informed Academic Integrity code of practice.

Methods

As the aim was to gather perspectives from a broad range of students across the university, a survey was chosen as the primary method of data collection as it allowed large numbers of students to be reached, was easy to disseminate and not time consuming for participants to complete. The survey questions were initially drafted in JISC online surveys by the three students employed within the academic skills team at the library. Three focus groups were then conducted by the student team, with the incentive of a ten pound Love 2 Shop voucher for those who attended. The aim of the focus groups was to test the draft survey on a small group (24 students) and ensure there weren't any questions included that would make students unlikely to complete the survey, or enter false information which would skew the results. Students were asked to consider whether questions made sense, if there were any questions which could cause discomfort to themselves or fellow students, if the wording was appropriate, and if there was any additional information/questions which could be included. Students were able to give responses verbally, which were recorded by a different researcher to the student running the focus group, and were also able to write down notes which were handed to the researchers at the end of the session. This ensured each student had a voice and maintained anonymity. Having an informal peer to peer environment allowed students the opportunity to express their thoughts or concerns about the draft survey.

Once the survey had been edited as a result of the suggestions from the focus groups and consultation with the University's Assistive Technologies group (consisting of lecturers from various subjects, staff from the Centre of Innovation and Education and Academic Quality and Standards Division), nine questions were included in total. The ethics approval restricted the questions that could be included about personal characteristics so the survey only asked about the student's faculty, level of study and confidence level in academic writing, and aimed to understand what GAI tools they had heard of, the purposes for which they thought they were appropriate to use, and how they thought the university should respond to the use of emerging technologies in their code of practice. The majority of the questions were multiple choice to allow for quick and easy responses, but with optional open elements to allow students to expand on and give reasons for their responses.

Every student who completed the survey had the option to follow a link to a separate survey, where they could enter their University email to enter the draw to win Bose headphones and a Kindle. This method ensured the original survey was completely anonymous and the original responses could not be linked back to their personal data.

The survey was open for 4 weeks in March – April 2023. Promotional methods included announcements on the Virtual Learning Environment, promotional screens across campus and emails from academics. Ethical approval was granted by The University of Liverpool Ethics Committee, ref 5326. Data analysis was performed using Excel and SPSS version 28. A Mann–Whitney U test was used to examine median scores of students self-reported confidence in academic writing and whether or not they had ever used or considered using GAI technologies. A Goodman and Kruskal's gamma test was used for comparing ordinal data such as confidence scores, level of study, and level of supportiveness when other students used technologies to help with grammar or essay writing (category "other" was treated as missing values).

Results

Focus group

The three focus groups consisted of 24 students overall, with a bias towards students from Humanities and Social Sciences (50%), although all faculties were represented. Half the students who attended were Taught Postgraduate students, whereas 42% were undergraduates and the remaining were Research Postgraduates.

Students made practical suggestions about the proposed online survey questions. Several students queried why the survey asked for level of study, faculty and whether English was a first language. After discussion it was decided that more information needed to be included in the survey about why these data were being collected, and a student suggested changing the question from English as a first language to general confidence in academic writing as this was less likely to cause offence and would potentially yield more useful results. Discussions with students in the focus groups also resulted in questions being altered to whether students had ever used or considered using technologies. This was aimed at reassuring students who completed the survey that there would be no consequences for admitting having used these technologies.

Online survey

Two thousand five hundred fifty-five students completed the survey, which represented 8.86% of the University population. The first question asked the students which faculty they belonged to. Results showed that the spread was reasonably proportionate to the university population.

Next, the students were asked for their level of study, which also showed that the survey had successfully reached different levels across the university, with a slightly higher proportion of taught postgraduates responding (Table 1).

Confidence in academic writing

The following question asked how confident the students felt about writing in an academic manner (1 = not confident, 5 = very confident). The majority of students rated themselves as a 3 or a 4 (Fig. 1). Fifty two per cent of students self-reported confidence levels of 4 or 5 for academic writing.

It can be seen that those in Humanities and Social Sciences had the highest levels of confidence, with 56.2% of respondents from that faculty rating their confidence as a 4 or a 5, with Health and Life Science students the least confident, with 46.7% rating their confidence as a 4 or a 5 (Table 2).

Table 1 Level of study of respondents compared to entire university population

Level of study	% of respondents	% of university population
Foundation	0.7%	1.2%
Undergraduate	69.7%	76.4%
Taught Postgraduate	22.7%	15.70%
Research Postgraduate	6.5%	6.7%

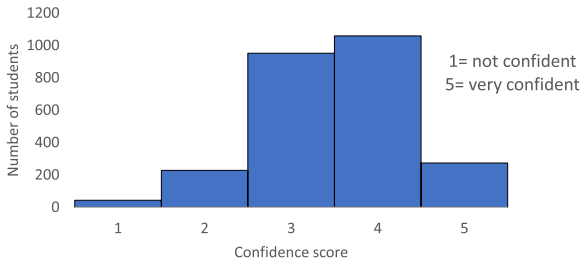

Fig. 1 Numbers of students with self-reporting levels of confidence in academic writing

Table 2 Confidence by faculty

	Humanities and Social Sciences	Health and Life Sciences	Science and Engineering
1	1.6%	2.0%	1.6%
2	6.4%	11.3%	9.4%
3	35.8%	40.0%	35.9%
4	45.3%	38.0%	40.2%
5	10.9%	8.7%	12.8%

Table 3 Confidence by level of study

	Foundation	Undergraduate	Postgraduate Taught	Postgraduate Research
1	5.9%	1.8%	1.4%	0.6%
2	5.9%	10.3%	5.5%	6.0%
3	35.3%	39.8%	33.4%	24.0%
4	47.1%	40.1%	43.3%	51.5%
5	5.9%	7.9%	16.4%	18.0%

The data suggest that as students progress to higher levels of university study, their confidence in academic writing increases, with the postgraduate researchers feeling most confident $\gamma = 0.253$, $P < 0.001$, $N = 2545$ (Table 3). It should be noted that only 17 respondents were foundation level students and the relationship was significant but moderate.

Students knowledge of GAI technologies

The second part of the survey began to focus on the student's knowledge, use and opinions of GAI technologies. They were asked if prior to completing the survey, if they had heard of any of the listed technologies. Grammarly (known by 88.5% of participants) and ChatGPT (known by 68.9%) were most widely heard of (Fig. 2).

Students usage or considered usage of GAI technologies

The following question asked if the students had used or considered using these technologies, what their purpose was for using them. Three categories were defined – Personal (with examples given of translations or recipes), Academic (checking grammar

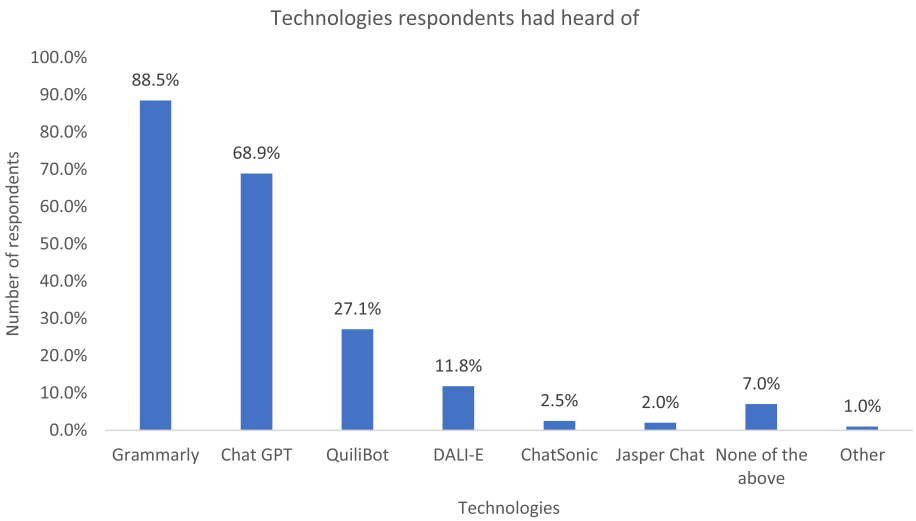

Fig. 2 Technologies heard of by respondents. Note. The option of "other" was also selected by 25 respondents, who added technologies similar to ChatGPT (12 out of 34 technologies suggested), while eight out of 34 technologies suggested were translation based, and five were Microsoft Office applications

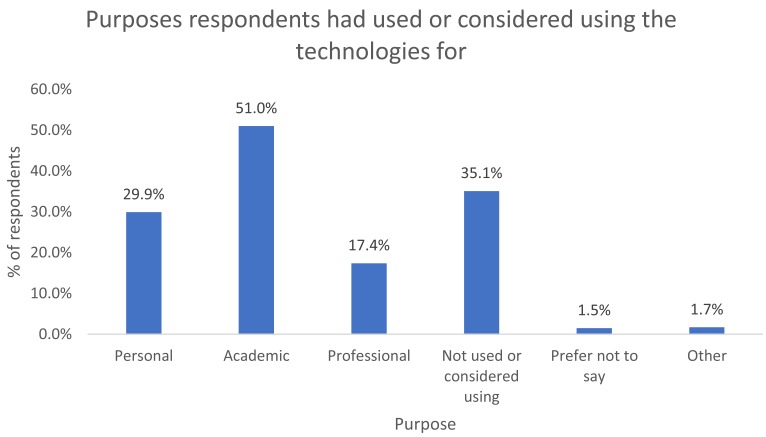

Fig. 3 Purpose for using technologies

and formatting references) and Professional (creating to-do lists or emails). The most common response was for academic purposes, with 50.9% selecting this (Fig. 3). Of the respondents, 35% had never used or considered using these technologies, demonstrating that the majority of the participants had used or considered using them.

There were 43 responses given for "Other", which could be broadly categorised into: using the technologies for fun or out of curiosity (17/43), in an academic context, where students used it for coding (6/43), grammar checking (6/43), and bettering understanding by asking for alternate explanations/rewording explanations (6/43). Other respondents stated that they had never used the technologies or they used them for general day to day tasks.

Some examples of participant responses are below:

"I have used ChatGPT to throw around ideas and to help with structuring work. I wouldn't use it to write anything, I wouldn't trust it to source correct information,

and it's known to provide citations and references that don't exist. I am interested in trying to use it to proofread work though, and apparently it can be used to summarise articles, etc. I think it could be used in lots of useful ways, but not for academic writing... yet!"
"Getting a basis knowledge to further know what to search for when finding references for papers. I also sometimes feel publications can be a bit overly complicated so having a simple answer given to a question is helpful for my understanding."
"I liked the idea of grammarly during A levels as it helped with my writing skills and vocabulary. But I never used it properly as it was a paid subscription."
"Everyday use, answering every-day questions, making workout-plan, health tips, mental health tips, ect..."
"Grammarly helps me detect plagiarism percentage before submitting my work"

There was a tendency for students from Health and Life Sciences to use or consider using these technologies less for personal and professional use than other faculties, but academic use was similar across the three faculties and the way students used or considered using the technologies did not appear to be affected by level of study. Foundation students, many of whom consist of mature students returning to education, showed marginally lower overall use/considered usage, however only 17 respondents were in this category.

Confidence in academic writing and use of GAI technologies

Students who had not used or considered using these technologies for academic purposes had a higher median confidence score in academic writing (median score 4, $N=1253$) compared to students who said they had used or considered using the technologies (median score 3, $N=1302$), U = 763,144, $P<0.01$ (Table 4).

Student views on other students use of GAI technologies

The following question asked the respondents how they would feel if another student had used a GAI technology as an academic aid (e.g. for grammar help) to complete a piece of university coursework. Respondents were asked to select the statement which closest matched their point of view. 54.1% stated that they were supportive or somewhat supportive of using technology in this way (Table 5).

Table 4 Students self-reporting confidence level in writing academically and how students use these technologies

	Personal use		Academic use		Professional use		Never used	
Confidence score 1 = not confident, 5 = very confident	% No	% Yes	% No	% Yes	% No	% Yes	% Used/ considered	% Never used
1	65%	35%	60%	40%	84%	16%	67%	33%
2	69%	31%	43%	57%	43%	57%	69%	31%
3	72%	28%	46%	54%	46%	54%	67%	33%
4	69%	31%	51%	49%	51%	49%	62%	38%
5	70%	30%	54%	46%	54%	46%	63%	37%

Table 5 Percentage of students who agreed with statements about the use of another student using these technologies for grammar help

Statement	% of respondents who selected this
Supportive – I think in 2023 we should all be using artificial intelligence technologies to make our life easier	27.2%
Somewhat supportive – I am fine with other students using software if they give credit to the technology in their work	26.3%
Neutral – I don't really have an opinion on this. I think it's up to the individual student to decide to use it/not the use it	26.2%
Somewhat unsupportive – I think these technologies still have a lot of limitations and I would encourage other students to check the information they find	11.6%
Unsupportive – I think it is really unfair for other students to use these technologies. People who use these technologies are effectively copying the work of others without giving full credit	7.4%
Other	1.3%

Of the 33 respondents who selected "Other", 17 of the comments suggested that they supported another student using these technologies for grammar support but not necessarily for anything else academic, while seven responses suggested that it depended upon the circumstances:

"I believe these technologies should be taken for what they really are, language models. All they do is feedback data specified from user inputted parameters, all information given by the model has to have existed previously, or inferred from pre-existing data. Therefore, these technologies should be used entirely as what they're designed for, to act as a search engine to help but not plagiarise. Disclaimers given within the software state that wrongful information can be given at times, and I feel while this is partially a limitation of technology, it is entirely negligence by students if this information is used."

"It is useful as an aid for those that may have disabilities or have additional learning needs and I would be supportive of this, but for able students I feel that assistive apps or technologies gives an unfair advantage for anything beyond simply checking grammar, spelling, etc."

"It depends, I think it's ok to use grammar check, especially for nonnative speakers. They have their own idea, and these kind of AI just like some advanced dictionary to help them express their ideas better. But for assistive technology like ChatGPT, there should be some policy to avoid improper use."

"think the uni students should be taught about the newest series of AI as its going to bee a huge part of our lives no matter the course and in 10-15 years time i think till it become part of all levels of teaching and if we don't learn how to used it effectively then we will be left behind the future generations. uni students can already get it to write them an essay in minutes without learning about it so i think unis should change assessment types and embrace the technology as unis are supposed to be preparing us for the future."

Some responses were extremes of the spectrum:

"It affects the future economoy when people undeserving of their degree have ended

in a profession that they cannot understand without AI. Furthermore, someone more deserving of that spot could be there, AI masks true intelligence."
"I don't think I would worry about anyone's coursework but mine!"

The following question asked the respondents how they would feel if another student had used a GAI technology such as ChatGPT to write their entire essay for them. Respondents were asked to select the statement which closest matched their point of view. Most students (48.5%) stated that they were unsupportive and thought it would be unfair for students to use these technologies and that those who do are effectively copying the work of others without giving credit (Table 6).

Forty of the respondents selected "Other" with 11 students stating they didn't know what ChatGPT was, and 10 responses demonstrating conditional support, with the most common answer being those who were supportive of it as an assist, but not for writing the whole essay:

"As an assistant it's helpful, but to do their whole essay takes away the integrity and pride from their work"
"I would support it if someone used it to check grammar or translation if English was not their first language, but not to write a full document. This would likely be abused by a lot of students, which would make the assessment unfair for those who don't."
"I think using it to check information, help with grammar and research things is fine. But it's not your essay if AI writes it for you. I hate writing essays and struggle with them, but you still have to do them"

Eight students went into more explanation as to why they would be unsupportive:

"Generally unsupportive, as they would be loosing out on the experience of writing an essay and the learning gained from it. Although feel like university assessments need to adapt to take into account the existence of AI assistance."
"Unsupportive of it because I think its unfair to not come up with ideas on your own and have to rely on AI to convey your thoughts. Its important to be able to phrase

Table 6 Percentage of students who agreed with statements about the use of another student using these technologies to write an entire essay

Statement	% of respondents who selected this
Supportive – I think in 2023 we should all be using artificial intelligence technologies to make our life easier	5.6%
Somewhat supportive – I am fine with other students using software if they give credit to the technology in their work	8.2%
Neutral – I don't really have an opinion on this. I think it's up to the individual student to decide to use it/not the use it	14.2%
Somewhat unsupportive – I think these technologies still have a lot of limitations and I would encourage other students to check the information they find	21.9%
Unsupportive – I think it is really unfair for other students to use these technologies. People who use these technologies are effectively copying the work of others without giving full credit	48.5%
Other	1.6%

and think clearly without external influences clouding or swaying your thought process."
"Unsupportive - the AI is limited by the data on which it is modelled. Whatever answers it provides cannot be taken as expert knowledge, but only as a reflection of the information which fed into it."

Five students were indifferent, largely due to the fact they thought any essay written by GAI technology would be of poor quality or easy to identify:

"…I suppose it depends how much of the input was original (ChatGPT tends to work from very short instructive prompts). Whether it is 'unfair' is probably a different discussion - these AI-generated essays tend to be extremely repetitive and incoherent. Few of them are close to pass-worthy, and those that are never really exceed a 50%. If we started seeing a lot of these essays being submitted, they would artificially raise the percentile in which students who had submitted 'real work' were graded, if anything."
"I think it would be obvious to tell if an essay is written entirely by AI, and so you probably wouldn't be given a good mark."
"Neither supportive or unsupported. I think using such technology like ChatGPT is different from using others like Grammerly. ChatGPT does the work for you. This takes away an individual acquiring the necessary skills that they should be building and personally developing during their academics. I feel it doesn't upskill an individual, where other technologies provide such opportunities."

Some students were supportive under certain circumstances such as to help with disabilities but also wanted clear guidance from the University:

"I don't mind others using it but I would prefer clear guidance from the university as to whether we can or cannot use it so then everyone can feel free to use it too."
"I'm fully in support, because when we reach singularity for computing, should we prevent use of technologies because it makes our lives easier? Should we ban calculators when it's a machine literally doing all the mathematical work? I don't think ChatGPT should be used without discretion, but there's no reason why someone can't ask it to write an essay as long as the student critically goes over the essay for their own edits and input."
"I think if used in an honest way it can be very helpful for understanding and as an aid in writing essays/papers/etc. What I don't agree with is solely using it to directly copy the information. Misinformation is common and fact checking is important. So, it's important to still encourage this when using these software. To become reliant on this type of software will only harm the individual and I think it's a real concern with the improvement of these types of software."
"it depends, some students due to disability need AI to help. If it was available to me and I didn't use it, that would be my choice"

Confidence in academic writing and views on others using GAI

There was a weak but significant association between students' confidence in academic writing and views on use of GAI technologies when other students use them for both

grammar $\gamma = 0.051$, $P < 0.05$, $N = 2522$ and writing an entire essay $\gamma = 0.130$, $P < 0.001$, N = 2515 (Tables 7 and 8). For example, of those with the lowest confidence score, 30.2% were unsupportive of another student using these technologies for writing an entire essay, whereas 55.7% of those with the highest confidence score were unsupportive (Table 8).

Student views on university policies for GAI technologies

Respondents were then asked how they thought the university should respond to these technologies. The most popular option was to have a university wide policy which made it clear when they are or are not appropriate to use, with 41.1% of respondents selecting this option (Table 9).

Of the 46 respondents who selected 'Other' the majority of students suggested that there be limitations put in place rather than an outright ban (18/46):

> *"Educate people on how the AI tools can be used in ways other than to simply cheat, for example to improve revision, speed up the writing process, or help with*

Table 7 Percentage of students, based on academic writing confidence, who do or do not support other students using these technologies for grammar support

Confidence score	Supportive	Somewhat supportive	Neutral	Somewhat unsupportive	Unsupportive	Other
1.00	27.9%	27.9%	30.2%	9.3%	2.3%	2.3%
2.00	31.1%	25.9%	26.3%	10.1%	5.7%	0.9%
3.00	27.9%	25.1%	28.2%	10.9%	6.8%	1.1%
4.00	25.4%	29.1%	24.8%	11.7%	7.5%	1.5%
5.00	28.2%	19.4%	24.2%	15.0%	11.7%	1.5%

Table 8 Percentage of students, based on academic writing confidence, who do or do not support other students using these technologies for writing an entire essay

Confidence score	Supportive	Somewhat supportive	Neutral	Somewhat unsupportive	Unsupportive	Other
1.00	14%	18.6%	27.9%	9.3%	30.2%	0%
2.00	8.3%	9.2%	13.2%	25%	41.7%	2.6%
3.00	5.4%	8.6%	16.5%	23.2%	44.9%	1.5%
4.00	4.5%	7.6%	12.5%	22%	52.2%	1.1%
5.00	7%	6.2%	11.7%	16.5%	55.7%	2.9%

Table 9 Percentage of students who agreed with statements regarding University policy on these technologies

Response	% of respondents who selected this
Ban them entirely	4.5%
Have a university wide policy on when they are and or not appropriate to use	41.1%
Let departments/ faculties decide the policy on when they are or are not appropriate to use	26.0%
Let lecturers decide individual policies for individual assignments on when they are or are not appropriate to use	16.9%
Allow them to be used however the students wish	9.6%
Other	1.8%

research skills. Students should be given full freedom to use tools available to everyone, however restrictions on extreme cases of cheating are acceptable."

Five students said it depended on the program/what it is being used for:

"I believe these technologies need to be embraced in an academic setting and adopted asap. The way the university should handle these technologies should be a mixture of the options provided in this survey… For example it may be appropriate for one department to allow AI to help with research, as long as it's referenced; for other departments it may be deemed inappropriate for it to be used and thus banned."
"I have found that assistive technologies can be really helpful without necessarily encroaching upon my academic integrity, for example I use it to quickly recall an obscure formula that would take me a while to find on the internet while doing problems. But when it becomes evident (using AI detectors) that submitted work is predominantly the work of the computer and not the student, measures and sanctions should be taken..."

Some students suggested that the university either embrace it or educate students on it (7/46), while others suggested changing the assessment format so the AI technology can't be used (3/46):

"i think students need to learn how to integrate this technology into their lives as its going to be used by everyone no matter what unis do so we need to learn how to use it."
""educate people on how to use them and its up to them to make a choice."
"I don't think it is an option to ban them entirely, for two reasons: (1) the technolgy will be used whether we like it or not, and it's only going to improve; (2) it's not always clear which assistive technologies are AI and I think this will increasingly become a grey area as the technology improves and more of these platforms become available. Students might not even realise that they are using AI in some cases. So use of AI needs to be regulated. There needs to be clear guidelines on what is acceptable use and what is not and the use of AI should be transparent… If the option to use AI is available to all, then it's a fair for all policy. If AI is used to help write pieces of work though, this should be reflected in the student's mark (e.g., 5/10 marks deducted)."
"Modify assessments in a way that requires more creative thinking so that AI tools can only be used supportively - in my opinion, it is the only effective way to manage their use by students"

Other comments supported lecturers or departments making decisions about the technologies uses but felt that students should be consulted further and that more research was needed:

"I agree with lecturers having the final decision, however i think that this choice should include hearing from and asking students on their opinions first."
"Research further into impact of uses and if allow the use then allow them to be free and accessible to all otherwise you create an accessibility gap - which I imag-

ine may already be present with respect to these tools"
"Maybe have a general uni policy and then a more specific departmental policy. It's difficult to ban the ai technology as they create unique pieces of work each time, so i don't know how the use of ai will be/could be monitored"

Other uses for GAI technologies

The next optional question asked respondents if they could think of any other ways these technologies could be used in their studies. There were 1131 responses received, with several students suggesting more than one use. The most common response was for grammar/spelling/punctuation help, followed by understanding a concept, planning, summarising text and search tool (Table 10). Comments grouped as 'Other' included several opinions about the technologies such as:

"These technologies may be used as a support but no one should consider these technologies to act on their behalf."
"I believe they can be used a learning tool rather than a tool to do your assignments for you."

Table 10 Other suggested uses of GAI technologies suggested by students

Other uses for Generative Artificial Intelligence Technologies	Number of comments
Grammar/spelling/punctuation	218
Other	177
No comment	126
Understand concept	110
Planning	103
Summarise text	101
Search tool	94
Research tool	77
Creating ideas	58
Referencing	53
Disability/Neurodiversity	52
Error checking	47
International/translation	49
Coding	39
Organisation	36
Revision	25
Career/employability	22
Emails	18
Answering questions	13
Not useful	13
Alternative to lecturer	11
Analysing data	11
Exam	9
Sharing/communication	7
Feedback	6
Collecting data	5
Content creation	4

"Anything except content, fine for grammar, references, formatting (to an extent), but once it's used for all content it's wrong"

Whilst several 'Other' comments suggested that students would appreciate training:

"I think they are unfair because some people won't know how to use them"
"If they are allowed to be used in certain areas, it would be important to have tutorials to show how to utilise the technology so all students are given the same opportunity to reach the grades."
"As these technologies develop at a quick pace i believe the onus is on the university to adapt to it and find useful ways to use it. If it doesn't, then it is left for the students to figure it out for themselves which is what we are currently seeing. I think this technology could be an amazing new way in which we use information and the university needs to realise this and act upon it, instead of being left behind in a bygone era of academia, just as it did with the invention of the computer and the internet."

General comments

The final question asked if they had any further comments and 669 responses were given with 379 distinct answers. There was a general consensus that Grammarly should not be compared to ChatGPT as the technologies were considered to be quite different, with 44 responses supporting the use of Grammarly, whilst 32 felt the GAI technologies were unfair. Despite this, 32 responses supported regulating rather than banning GAI, and 49 felt that GAI should be embraced and taught to students or that they would be useful in future careers.

"I believe AI is the harsh reality of a bigger, better and brighter world. I wouldn't use it to write an essay. But to find sources, give me ideas etc it's great. The people using it to do absolutely all their work for them are only cheating themselves and will more than likely suffer academically."
"The modern workspace is adapting and students are always going to find a way to adapt with these technologies. Rather than banning them, integrate them and teach about how they can be inaccurate about information ect"
"If the university shuns AI then it will harm each student, as it limits their ability in a competitive world environment. If the university ignores AI then this will cause all degrees to become effectively worthless."
"AI tools are powerful, but they are just tools. I think using AI for inspiration is much more effective than using Google, giving a more polished answer. But the tool is only as good as the person using it."
"These technologies are super helpful, coming from a non-academic family means that I can't ask my parents simple questions like how do I structure a systematic review. Lecturers never answer the basic question because they presume we already know how to reference, how to write. Even if you type into Google structure of a systematic review all of them our journal articles and don't answer in a way I can understand. I believe using ai technology to assist, for example asking for help with structure, asking simple questions if you don't understand the research topic and need it to be explained is fine. However, when using it write an entire essay is wrong,

unfair and classed as plagiarism."

Seventeen of the responses highlighted the advantages for disabled students, and 10 suggested that these technologies are particularly useful for international students.

"Remember: banning AI blankly can hurt disabled students. I use AI to navigate CANVAS because of lack of accessibility features"
"…it's likely that ai will be being used more and more, and more collaboratively in the workplace and so it would set students up better for the workplace. It seems that a re-imagining of how universities share and grow knowledge is necessary. Now, more than ever, genuine collaborative discussions and challenges of knowledge seems important. This is an opportunity to grow and enhance our education system. Returning to closed book exams may check what students can remember, but it's inaccessible for disabled people and it doesn't challenge people to think. They are only good because they're easy."

Finally, some students appreciated the opportunity to take part in the survey and have their say:

"Thank you for the invite and asking these questions."
"I'm impressed that the university is asking for the students opinions on this and hope a dialogue can continue into the future on how we use these new and exciting technologies to ultimately improve how we all learn and develop ourselves at university."
"This is a great a topic and one I haven't really thought about!"
"Thank you to let me participate in this survey."
"Nice short survey!"

Discussion

The results of the present study indicate that the majority of students were aware of GAI technologies and that half of them had used or considered using them for academic purposes. The majority of students supported other students using GAI technologies for grammar help, but most were unsupportive of another student using the technologies to write an entire essay. Similar results have been recorded in a survey of students studying in Australian universities (Bretag et al 2018). Of the Australian students who responded, the majority agreed that obtaining and submitting an assignment or getting exam assistance was wrong, however these were amongst the most common 'cheating' behaviours in the study (Bretag et al 2018). Similarly, Harrison et al (2020) reported that students considered there to be a difference between paying another individual to write an entire essay and having study aids. Qualitative responses from the participants in the current study support this finding and several students stated that they used GAI technologies as an alternative to lecturers or to understand a concept. These results indicate that students consider assistance with minor edits such as grammar, understanding concepts, assisting with disabilities/neurodiversity and language barriers to be acceptable practice for GAI, but not to write entire assignments. Bretag et al (2018) also noted that the three most common reasons for 'cheating' were dissatisfaction with the learning and teaching environment, opportunities to cheat and being a non-native speaker. Since technologies

such as ChatGPT are easily accessible and 69% of respondents in this study were aware of ChatGPT, it provides substantial opportunity for students if they do wish to use these technologies for writing assignments or answering exam questions. Therefore, the onus must be on educating students on best practice for these technologies, instilling a sense of integrity and designing appropriate and engaging assessments.

Participants were asked to rate their confidence in academic writing and results suggest that students based in the Humanities and Social Sciences faculty, and Postgraduate researchers, were the most confident. Research from others has also demonstrated that postgraduates are more confident in various aspects of university study, such as referencing and understanding plagiarism (Newton 2016). Interestingly, the study by Newton (2016) found that students who were more confident in referencing were more supportive of strong penalties for academic misconduct. These findings reflect the outcome in the present study where students with the highest confidence levels in academic writing were less empathetic towards other students using GAI technologies than students who had lower confidence levels. Previous research has found that students who are more empathetic show more altruism and students who are more honest have higher levels of pro-social behaviour (Allgaier et al 2015; Litvack-Miller et al. 1997). However, other studies have demonstrated that students are less likely to feel empathy if they believe another student has tried to gain an unfair advantage, (such as adjusting their grades on official documents) (Pupovac et al. 2019; Yachison et al. 2018), which some students in the present study felt GAI technologies facilitated. There are contrasting results in terms of academic ability and willingness to report peers for misconduct (Lawson 2004; Pupovac et al. 2019), but there is evidence to suggest that students who score higher marks are less likely to commit academic misconduct (McCabe & Trevino 1997), so it would be reasonable to assume they would be less supportive of other students committing perceived misconduct through GAI. Differences have been observed between men and women in response to 'cheating' (Simon et al 2004; Yachison et al. 2018) and one of the limitations of the current research is that gender ratios are not known for the participants, therefore this variable may have an impact on the results. The results in the present study also suggest that students with lower confidence in academic writing were more likely to use GAI technologies. Software such as Grammarly has been shown to increase students' confidence in areas such as essay writing and avoiding accidental plagiarism (Lazic et al 2020). Amigud and Lancaster (2019) identified that academic ability was related to students usage of essay mills. These results suggest that confidence in academic writing is a factor in students usage of GAI technologies and empathy for other students using the technologies.

Student confidence is an important consideration for university policy since banning the technologies may disadvantage certain groups, such as those who need support with academic writing, disabled/neurodiverse students, and students who do not have English as a first language (Fatemi and Saito 2020). Universities may also wish to consider providing their own GAI technologies in the future as some students highlighted the inequality of access to paid versions. It is worth note that several free text comments highlighted the limitations of the technologies, and some even suggested that the limitations would result in poor marks for students who abused the technologies. Conversely, there were no comments about concerns that GAI technologies may be unsafe,

for example reusing information uploaded to them to answer the questions of others, although no specific survey question was asked on this topic (Lund and Wang 2023). Other safety issues relating to personal information have been raised with technologies such as ChatGPT (Li et al 2023). Awareness of advantages and limitations could be increased if universities invest in training staff and students on how to use them. This may result in fewer students using the technologies inappropriately since misunderstanding is one of the reasons identified that can lead to accidental academic misconduct (Perry 2010).

Participant comments in the final question of the survey (any further comments) suggest that clarity and fairness in the use of these technologies is a priority for students and universities should consider a university-wide policy as a default position, with flexibility if lecturers wish to allow alternative use of ChatGPT for assignments. Students in this study felt that there was a clear distinction between error checking, such as grammar check and code fixing, and using GAI to create an entire assignment. Respondents largely felt that banning the technologies entirely would be a backward step and could disadvantage them in future careers. Decisions in policy should therefore aim to reflect these issues.

Although students may have been unlikely to suggest using GAI to create an entire assignment in this survey, some did suggest using the technology to generate plagiarism reports prior to submission and to assist with online exams. However, these responses were outweighed by a large number of other uses (Table 10), some of which require caution. For example, ChatGPT may not accurately summarise an article, but it could be useful to decide if the student wishes to read the whole the article for themselves. ChatGPT has also been shown to make mistakes in referencing and may be biased by the datasets used to train it (Baidoo-Anu and Owusu Ansah 2023; Gravel et al 2023). Eleven free text comments referred to using GAI as an alternative to lecturers, which was due to time availability of the lecturers or needing an alternative explanation. A recent review recommended the use of ChatGPT as a virtual tutor as it can provide alternative explanations (Baidoo-Anu and Owusu Ansah 2023), which appears to be a frequent suggested use of GAI in this study, since using it to understand a concept was second only to grammar and spelling support for suggested uses (Table 10). This research also demonstrates the importance of co-creating policies with students.

Conclusions

It can be seen from the results of this survey that GAI is already being widely used amongst the student population for academic and personal purposes. This suggests that attempts to ban the use of these technologies or change assessments to be entirely exam-based is unrealistic and not beneficial to students, who will likely need to use these technologies in their careers upon leaving university. Instead, universities need to help students develop their skills to use these technologies in a productive and effective manner. Students can be seen to already be creative with their usage and keen to explore ways to get the best out of these technologies whilst having an awareness of their limitations, suggesting that utilising students to co-create guidance for positive usage should be considered.

The differences in attitudes towards the different types of technologies and the different usages can also be seen here – with much more acceptance towards using them for grammar checking than for essay writing. Students with self-reported higher confidence levels have less empathy for those who use the technologies, but by banning their usage, we disadvantage the students who have less confidence. Future studies need to investigate how lower confidence increases use of technologies, as the present study indicates that this could be a factor (and it doesn't mean they are using the technologies to 'cheat').

Students also pointed out that these technologies can be of great benefit to different groups – for example disabled, international students or those who are first in their family to attend university. It is important that policies around usage do not disadvantage these students. Cost is another consideration – whilst many of these tools are currently free, should universities subscribe to a chosen recommended GAI technology to give all students equal access in the future to the best tools on the market?

Students were keen to have some guidance in terms of what is or is not allowed in relation to using these technologies for their academic work, and as the majority wanted an overall policy, it is clear they want to be able to have the same guidance that would be applicable to all the work they produce throughout university.

Abbreviations

GAI	Generative artificial intelligence
ChatGPT	Chat Generative Pre-Trained Transformer

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Authors' contributions
All authors read and approved the final manuscript. BP Conceptualised the study, performed project administration, co-wrote the introduction, literature review, methods, findings, conclusion and performed analysis of the data. HJ Conceptualised the study, performed project administration, co-wrote the introduction, literature review, methods, findings, conclusion and performed analysis of the data. RW collected the data, performed analysis of qualitative data and approved the final manuscript. TB collected the data, performed analysis of qualitative data and approved final manuscript. ES collected the data, performed analysis of qualitative data, contributed towards the literature review and approved final manuscript.

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Declarations

Competing interests
The authors declare that they have no competing interests.

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