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Evaluating the Impact of ChatGPT on Student Performance in Academic Writing

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Abstract

Understanding how Artificial Intelligence (AI) tools like ChatGPT can be useful for students and educators is essential as AI is being integrated into our everyday lives and is shaping educational practices and can enhance student learning. This study investigated whether the use of ChatGPT helped students write their essays better. Data were collected from 21 undergraduate students at a UK university. All participants were required to write two essays: one with the use of ChatGPT and one without the use of ChatGPT. They were given 25 minutes to write each essay. The results indicated that there was a difference in the quality and structure of the essays which led to a higher grade for essays where ChatGPT was used. Students who used AI for their first essay also scored higher in the second essay where they did not use AI. These results aligned with our hypotheses that students would score higher grades when writing essays with the help of ChatGPT, and that students who used ChatGPT for the first essay would score higher in the second essay which was without the use of ChatGPT. The findings provide insights on the usefulness of ChatGPT and how its further development can enhance student learning experiences. The study signifies the importance and reliability of AI tools like ChatGPT in the education sector.

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Introduction

Since the development of Chat Generative Pre-Trained Transformer (ChatGPT) and other generative Artificial Intelligence (AI) platforms, the field of AI has tremendously advanced, being involved in teaching, learning, educational feedback, and being used as an evaluation tool (Altarawneh, 2023). AI is widely used across the world nowadays in numerous sectors, such as medicine, law, retail, finance, and supply chain management (Collins, Conboy, Dennehy & Mikalef, 2021). Its impact in Higher Education (HE) is undoubtedly immense as it facilitates education in different subjects such as mathematics, programming and language learning, and it provides support to various teaching and learning activities like content preparation and dissemination, interactions and collaboration, and performance assessment (Wang, Wang, Zhu, Wang, Tran, & Du, 2024). Furthermore, it adjusts instruction to the demands of various learner types and predicts academic performance (Crompton & Burke, 2023). Embracing ChatGPT can help produce meaningful research in a more efficient and effective manner (Huang & Tan, 2023). There is a positive impact of the use of ChatGPT on students' academic writing skills (Khampusaen, 2025; Mahapatra, 2024).

ChatGPT is a chatbot operated by a Large Language Model (LLM) that can generate conversation-style responses based on users' queries (Ayman, El-Seoud, Nagaty, & Karam, 2023; Brady, Kuvalja, Rodrigues, & Hughes, 2024). The use of AI tools such as ChatGPT have been increasingly adopted by students to help them with their course work, with a strong desire among students to learn more about how to use AI tools and how to use different AI tools, and an interest in receiving committed support for implementing these tools in their coursework (Jelson & Lee, 2024; Thomson, Pickard-Jones, Baines, & Otermans, 2024). Encouraging positive attitudes towards AI can increase its use in educational environments (Otermans, Roberts, & Baines, 2025). Due to the huge rise in students using AI platforms in their university coursework, ChatGPT and other generative AI platforms have resulted in educators needing to reevaluate traditional teaching and assessment methods (Revell et al., 2024). According to Chiu, Chai, Cheng, Zhou, and Xia (2023), designated institutions in the United States are researching and creating AI-powered personalised learning systems that could improve academic achievement by increasing students' cognitive engagement and lessen educational disparities by helping disadvantaged students. The integration of AI into education systems has appeared to have a transformative approach in enhancing personalised learning experiences and predicting academic performance in the US (Shawon, Miah, & Islam, 2023). AI-driven learning is transforming global education by offering tailored educational experiences, improving learning outcomes, and enhancing student engagement (Wang, Hussain, & Mao, 2025). A recent paper by Aditya, Silvestri, and Otermans (2024) examined the impact of using an AI teacher for HE students across three countries and found that students demonstrated high engagement with the AI teacher, positive ability of the AI teacher to improve completion rates of courses, and a high overall satisfaction rate of lessons provided by the AI teacher. At university, the courses offered incorporate assessments, such as essays and written exams, as a way of evaluating students' understanding of content and their knowledge. Beyond the resources being offered by their lecturers, such as lecture slides and notes, journal articles, and textbooks, students need to find external resources which can benefit their academic journey. ChatGPT is a resource that can be used for generating ideas, brainstorming, learning grammar, and vocabulary (Mahapatra, 2024). Both lecturers and students tend to have a positive perception on the use of ChatGPT in teaching and learning (Mai, Da, & Hanh, 2024). AI can be used to enhance learning by improving

students' skills and abilities in various academic areas, collaborating learning in Higher Education Institutions (HEI), and an accessible research environment (Kuleto et al., 2021). Malik, Amjad, Aslam, and Fakhrou (2024) believe that ChatGPT would help provide more and better opportunities by helping academics, researchers, and students in solving academic issues, exploring new ideas, and improving their concepts by enhancing their understanding of ideas and theories. However, the integration of AI platforms in student learning and assessment is only beneficial if the validity, reliability, and accuracy of the materials provided are regularly evaluated (Zirar, 2023). Even though the field of AI in education has a sizeable history as a research domain, its rapid evolution has never sparked such prominent public discourse (Bond et al., 2024).

Whilst some academics encourage students to use AI, students should know how to use it properly and ethically, so that they adhere to the rules of good academic conduct. Some students may misuse AI tools like ChatGPT for plagiarism, but these tools also aid in plagiarism detection (Kronivets, Yakovenko, Tymoshenko, Ilnytskyi, Iasechko, & Iasechko, 2023). While some educators believe that AI is the future of learning, teaching, assessment and administration, others argue that it is not clear whether AI actually boosts education nor if the emerging technologies have a positive impact on the learning experience (Holmes et al., 2021). Furthermore, Thomson et al. (2024) found that most students were not familiar with their respective university's AI policies. In addition, lack of technology expertise from lecturers can make it difficult for the implementation of AI usage in educational institutions (Chiu, Xia, Zhou, Chai, & Cheng, 2023). Since the education sector is associated with business environments which are mainly controlled and maintained by information systems, the recent advancement in AI constitutes the need to identify the issues regarding their implementation in the education sector (Owoc, Sawicka, & Weichbroth, 2021). The education sector is associated with business environments because it has a lot of market competition, relying on tuition fees, allocation of resources, policy changes, and others. The field of AI is rapidly advancing, and the ways it reshapes education is changing from one week to the next (Foltynek et al., 2023). The purpose of this study is to understand whether students improve their performance by using ChatGPT as well as how they use it in an essay-based assessment. The research questions for this study are: How does the use of ChatGPT impact students' performance in their academic coursework? How do students use ChatGPT in producing coursework? This leads to the following hypotheses:

H1: Essays written using ChatGPT will receive higher grades than those written without ChatGPT use.

H2: Students who use AI for the first essay will score higher on their second essay (without AI).

Method

Participants – Experiment

For this experiment, participants were recruited through the SONA system at the authors' institution. This is a system where Psychology students can take part in research studies to receive course credits. Prior to the experiment, a survey was conducted online, asking a range of questions, including age, gender, knowledge of AI tools like ChatGPT, and approximate hours spent on the internet. A total of 21 participants took part in this study. Their average age was M = 22.58 years old, SD = 5.5 and age ranging from 18 to 37 years old. Out of them, 9 (42.9%) were males and 12 (57.1%) were females. The participants were from various years of study: 12 (57.1%) were in their Year 1 of studies, 8 (38%) in year 2 of their studies, and 1 (4.7%) in year 3 of their studies. In relation

to previous qualification before entering university, 12 (57.1%) participants entered with A-levels, 2 (9.5%) with A-levels and BTEC, 2 (9.5%) with BTEC, and 5 (23.8%) with Other. It was also found that 13 (61.9%) participants received their education within the UK, 1 (4.7%) within the EU, 1 (4.7%) within the UK and within the EU, 1 (4.7%) within the EU and international, and 5 (23.8%) in international countries. In terms of being the first in their family to enter HE, 14 (66.7%) answered no, 6 (28.6%) answered yes, and 1 (4.8%) preferred not to say. In terms of their living situation, 8 (38.1%) participants lived with their parents, 6 (28.6%) lived in student accommodation, 6 (28.6%) lived in private rental accommodation, and 1 (4.8%) lived in council accommodation. In relation to the time it took to commute to university, 10 (47.6%) participants took 20 minutes or less, 2 (9.5%) took between 20-40 minutes, 4 (19%) took more than 40 minutes but less than 60 minutes, 3 (14.3%) took more than 1 hour but less than 2 hours, and 2 (9.5%) took more than 2 hours. In relation to their household income, for 9 (42.9%) this was below £25K, for 3 (14.3%) this was between £25-50K, for 5 (23.8%) this was between £50-100K, for 2 (9.5%) this was above £100K, and 2 (9.5%) preferred not to say. Regarding their eligibility for free school meals, 11 (52.4%) participants said they were not eligible, 9 (42.9%) said that they were, and 1 (4.8%) preferred not to say. With regard to caring responsibilities, 18 (85.7%) participants answered no, 2 (9.5%) answered yes, and 1 (4.8%) preferred not to say. For their first language being English, 11 (52.4%) participants said no whereas 10 (47.6%) said yes. Lastly, for having a in relation to having a disability, 18 (85.7%) said they did not have a disability, 2 (9.5%) said they did have a disability, and 1 (4.8%) preferred not to say. Data collection took place between 17th January 2025 and 26th February 2025.

Experiment Set-Up

The pre-experiment survey was conducted online using JISC (Www.Jisc.org). The main experiment set-up was conducted in-person. Participants were not informed of the essay questions beforehand to assure validity of the study. The participants were given one of four procedures to take part in, and each participant was allocated a particular procedure based on a pre-decided order (using randomisation). Each procedure had two different essay questions: 1. ‘How do the different structures of the brain (e.g., the frontal lobe, hippocampus, or amygdala) contribute to specific aspects of human behaviour? Provide examples to support your answer’; 2. ‘How do modern neuroimaging techniques, such as fMRI or PET scans, enhance our understanding of the relationship between brain activity and behaviour? What are some limitations of these methods?’ The four procedures were as follows: Procedure A: Question 1. with AI, Question 2. without AI; Procedure B: Question 2. without AI, Question 1. with AI; Procedure C: Question 1. without AI, Question 2. with AI; Procedure D: Question 2. with AI, Question 1. without AI. Procedures A and B, and C and D are counter-balanced for order. To answer each question, all participants had a 25-minute window. Participants answered the two questions consecutively in the same session, in the order defined by the procedure, with a brief break between each question.

Data Collection Method – Interviews

A total number of eight semi-structured interviews were conducted by two members of the research team. The interview schedule consisted of questions regarding the participant’s use of AI, their views on AI and education, and the participants’ experience on writing two essays, one with and one without AI. They were conducted online

through Microsoft Teams and were audio and video recorded, except for P8 whose interview was only audio recorded. Participants were presented with the Participant Information Sheet and the Informed Consent Form prior to the interviews. The length of the interviews was approximately 30 minutes. After the completion of the interviews, participants were sent the Debrief Form and were granted two Sona credits.

Table 1. Demographic Data of Participants and Duration of Each Interview

Participant	Duration of interview	Level of study	Gender
P1	19 minutes and 37 seconds	Level 5	Male
P2	23 minutes and 34 seconds	Level 4	Male
P3	28 minutes and 03 seconds	Level 5	Female
P4	52 minutes and 42 seconds	Level 5	Female
P5	32 minutes and 10 seconds	Level 4	Female
P6	18 minutes and 33 seconds	Level 5	Female
P7	22 minutes and 34 seconds	Level 4	Female
P8	31 minutes and 29 seconds	Level 5	Male

Data Analysis

Quantitative Analysis

Frequency analyses using SPSS were conducted on the questions that were asked in the pre and post survey (i.e., the Likert-type style questions and the yes/no questions). There were also objective/open-ended questions in the surveys, the responses to these were summarised. After the data collection was completed, the essays that were written during the experiment were graded by two of the authors. The markers did not know whether AI was used in each essay as each essay was given a random number. There were 42 papers in total that were marked: 21 with AI and 21 without AI. The papers were marked using a rubric metric system, where the markers highlighted the appropriate box in a seven-point matrix (i.e., “outstanding”, “excellent”, “very good”, “good”, "acceptable”, “unsatisfactory”, “unacceptable”) for each of three marking criteria: presentation, content and knowledge, and answering and addressing the question. In addition, each marker provided three strengths and three areas of improvement for each essay. A holistic grade was provided along with a comment as to whether AI was used to write this essay. A comparison analysis was done to compare the grades and feedback of the markers.

Qualitative Analysis

Thematic analysis was used to identify, analyse and interpret patterns in the data. This method was the most suitable as it allowed the researchers to uncover recurring themes and patterns after a careful examination of the interview transcripts that represent key aspects of the research topic. The Thematic analysis followed the six-step process from Braun and Clarke (2006). First, the familiarisation with the data was necessary, then the process of generating codes and the creation of themes took place. This resulted in eight themes.

Ethical Considerations

Before taking part in the study, participants were presented the Participant Information Sheet (PIS) to inform them

about the details of the study. After that, participants were asked to sign the Consent Form thereby agreeing to take part in the study. After the completion of the study, participants were provided with the Debrief Form, in which the reasons why participants took part in the study were stated and how the completed research would enhance the understanding of using AI in teaching and learning and would enable the researchers to add to the existing research in the area and enhance student experience. Participants were allocated SONA credits after the completion of the study (eight for the experiment and two for the interview).

Results

Qualitative Results

Eight themes were identified from the data: ‘General AI use’, 'Qualities of AI’, ‘AI’s popularity’, ‘Possible uses of AI’, ‘Essay with or without AI’, ‘Essay writing method’, ‘University’s support’, and ‘Advice on AI usage’. ‘General AI use’ refers to the frequency participants use AI, what they use it for, and the specific AI tools and versions they use. ‘Qualities of AI’ refers to the advantages and disadvantages AI has not only in the general use of AI for the participants, but specifically in the task they had in the experiment. ‘AI’s popularity’ refers to the popularity of AI among university students regarding the academic context. ‘Possible uses of AI’ refers to the appropriateness of using AI for different academic tasks, such as writing a cover letter with the help of AI. ‘Essay with or without AI’ refers to the performance of the participants on the two essays and how comfortable they felt in each case. ‘Essay writing method’ refers to the approach participants followed to write their essays and the overall writing process. ‘University’s support’ refers participants’ opinions on whether universities should play a role in incorporating and promoting AI tools. Last but not least, ‘Advice on AI usage’ refers to the advice participants provide as to how students should use AI properly and ethically.

General Use of AI

This theme describes the different uses of AI in the participants’ lives. Some participants mentioned using AI, specifically ChatGPT, on a daily basis for daily activities while others mostly used it as a guidance for their assignments. In some cases, it was a combination of the two:

> *“Well, I kind of use ChatGPT on a daily. If I can give an example, I used it yesterday for a recipe” (P6, l. 29-30).*

Some participants found it useful for academic purposes, such as guidance for the exams:

> *“And I also do the same with studying. So, if a question does not make sense to me or if an assignment is entirely not making sense to me, I’ll put that in and ask it to explain it to me in the easiest way possible, and so it makes my life easier” (P6, l. 33-36).*

Or note taking:

> *“And then I've also just done it for some notes taking. So, if there's a subject I already know about and I'm not too sure I want to reformulate some notes and I'm too sure how to approach it, I'll ask for notes creating a specific way, so I'll ask about the sort of object. What I want included and all that, and I can see a specific structure which I can inspire myself from” (P5, l. 30-33).*

Another use of ChatGPT is for students to comprehend the lecture material:

> *“So, sometimes I use it to help with lecture content and like understanding it. So ChatGPT will, like, just write things in a way that makes it easier for me to understand. Like, well, I tell them to simplify the language and stuff” (P7, l. 20-22).*

ChatGPT can be helpful especially for grammar and spelling when students spend a lot of time writing essays or lab reports because it helps them to remove errors:

> *“I think it can be useful for sure because sometimes when we write an essay. Or whatever a lab report we might, we may spend a*

lot of time working on it and um then we can forget that we have made some small errors. So just double checking and verifying with um An AI tool would be a good idea" (P3, l. 207-210).

Furthermore, many participants have used ChatGPT for CV writing and cover letters:

"I think it's very useful like. Because I've used it to help my CV and I already have my CV, so I just like got ChatGPT to just edit it a little so that it sounds more professional" (P7, l. 238-239).

In conclusion, ChatGPT is widely used across participants, particularly as an assistant for their academic duties and for everyday tasks.

Qualities of AI

This theme describes how participants view ChatGPT as an AI tool. It delves into the strengths and weaknesses of ChatGPT not only for the participants' personal use, but also for the task they were assigned to complete in the experiment. Many participants had a positive view on ChatGPT's potential:

"I like how it can like it's detailed information, but it's easy to understand" (P2, l. 42-43).

The accessibility and time efficiency are crucial factors for participants to use ChatGPT:

"You can find out obviously information a lot easier. Rather than it's very accessible, isn't it, you know" (P4, l. 64-65).

Moreover, it can provide support for the academic work:

"I find it helpful in the kind of starting the work more than anything. I think after that it is, but it's it's a good starting point, especially if I'm studying alone" (P5, l. 49-50).

Not to mention the clarification it gives for difficult terminology included in academic articles:

"And now it's very useful tool in my life. It's made my academics a lot easier. Like when it's when you're reading articles, especially like some of the words are just too tough for me to understand and I'm like, OK. I need. I need it dumbed down and that's what AI comes in handy" (P7, l. 328-331).

However, when asked to write the essay with the help of ChatGPT in the experiment, a few participants faced challenges:

"And I've had Chat give me articles before, but always cross-reference them, and a lot of the time it's wrong. Like it will just find a fake article and give me a fake name" (P7, l. 142-144).

Another downside is often ChatGPT's lack of precision in its answers:

"Sometimes like my conversations will be too long. It will be on. I'll keep asking questions to ChatGPT because I just don't understand. Or if I want to gain more insight on this certain topic. And then it's like I can't use it anymore. I have to start a new conversation. That's the only downside" (P7, l. 380-383).

Thus, in general, students were very positive to the use of AI but recognised to use it with caution.

AI's Popularity

This theme dives into participants' perspectives on how popular AI is, specifically ChatGPT. All the participants had used ChatGPT before taking part in the experiment and some of them are very familiar with it.

"I think it was actually the first AI that I used, and it's the one I'm like most familiar with" (P2, l. 86).

Nevertheless, not everyone was using AI before becoming a university student, however there was an openness to try it:

"I think it's very popular because I only found out about like AI coming to Brunel like before then I never touched AI but stayed away from it. And then obviously students that give me tips on how to use AI and OK let me try it" (P7, l. 326-328).

ChatGPT's popularity mainly stems from the fact that students rely on it to generate ideas to write their essays:

"I think it is quite popular because, when I discuss about how my fellow students' peers use, how did they find the ideas to write

> *their essays. They said that they consulted ChatGPT with it and they, like, try to get help from it. So, I think everyone, everyone, not everyone but a big percentage of students use. Uses ChatGPT" (P3, l. 244-247).*

In conclusion, ChatGPT is globally known and widely used among students. Even though some of the participants had never used it before, they were open to try it.

Essay With or Without AI

This theme delves into participants' experiences on writing the essays with or without the help of AI and whether AI helped them perform better. In general, participants were more confident when they wrote one of the essays with the help of ChatGPT, as it offered more content and structure:

> *"The one I wrote myself was based on what I could recall from lectures, which wasn't much but was more rewarding. So, the AI-generated one had more structure and detail...it had more content and structure than what I could have done on my own" (P1, l. 89-90 and l. 94).*

ChatGPT also provided more information on the essay question:

> *"Because it helped me, with gather the information and also did give me a guide to like structure it as well" (P2, l. 226-227).*

Also, the information was ready from ChatGPT, so participants did not have to revise content to answer the essay question:

> *"I'm not in that mood to go over context and content and lecture slides so I feel like the ChatGPT boosted my essay and helped me a lot" (P8, l. 200-205).*

On the other hand, even though ChatGPT provided more information on the essay topic, some participants felt more confident writing the essay without AI because they relied on their own ideas:

> *"And so I felt more confident writing that non-AI one, whether it was right or not. It's like this is my own words. So I feel better about it" (P7, l. 198-203).*

One participant stated that they performed equally in both essays, and they would have performed better if they had more time:

> *"The one with AI I don't think I did very good. I think I, I made a decent essay. I don't think it was terrible. I don't think it was good either. I think it had. It had a decent ish structure. It followed a bit of a ladder of content...while the non-AI, I don't think I did great either. I'm not very good in time circumstances. Especially if I haven't had time to prepare mentally beforehand um. I definitely would have needed more time for it" (P5, l. 183-185 and l. 187-189).*

Finally, one participant was not satisfied with the answers ChatGPT gave, as they did not support the participant's writing style:

> *"No, I wasn't happy because it's just not my writing style, so I couldn't copy and paste it because like, this isn't how I would write. I don't sound like this in my like essays and stuff, just like it. Doesn't feel right to copy like words that aren't mine" (P7, l. 221-223).*

In most cases, participants found the essay with AI better, as it was written with better structure and detail, more information to answer the essay question was provided and the ideation helped the students perform better compared to the non-AI essay. However, in a few cases the non-AI essay was better for some participants because they could use their own ideas and writing style.

Essay Writing Method

This theme describes the approach participants followed to complete their essays, how they prompted and edited information, when they decided they had written enough to finish the essays, and the time consideration. The prompting method varied between the participants. Some of them decided to use only one prompt for the essay

with ChatGPT:

> *"Because I've used perplexity for lab reports before, so I knew if I asked the right question, I wouldn't need to do much more" (P1, l. 73-74).*

Other participants used more prompts, sometimes breaking the question into smaller parts:

> *"So, I put the first question in like, the main research question. And then I started putting like fewer chunks bit by bit. Like, what is this section of the brain and what is this in the left hemisphere and what is this and what is that? And just started writing. That's it" (P8, l. 109-112).*

The time restriction was an important factor for participants to consider when they were writing their essays:

> *"I think what I thought was I also had to consider how much time I had. Actually I did also mention I think I did mention in my prompt with that I only have this much to write this essay" (P2, l. 128-130).*

And the fear of plagiarism because of the unfamiliarity with ChatGPT also existed:

> *"I found it a lot harder with the Chat because I feel like in your head, you're just like, OK, so this is kind of copy. This is like plagiarism. So what am I supposed to be doing with Chat to help with my answer?" (P7, l. 71-73).*

While some participants solely copied and pasted the answers ChatGPT gave them:

> *"Ok for the ChatGPT thing, I was just trying to get that done so I was copying and pasting essential stuff. I did read through and added whatever I felt was relevant" (P6, l. 89-90).*

Other also tested whether the answer from ChatGPT was right:

> *"And then I kind of asked for different improvements that I knew that ChatGPT wouldn't automatically do, so try to add more relevant research or I think I did something about asked about this, yeah. And I tried to go over different mistakes that I could maybe see were present" (P5, l. 110-113).*

While another one took some sentences from the ones ChatGPT suggested:

> *"I think yeah just read what ChatGPT like suggested and then, yeah, took a lot of parts from it and wrote it to my answer" (P3, l. 124-125).*

Regarding the finalisation of the essay, the decision was made based on the satisfactory amount of paragraphs written in the essay including the most relevant information on the essay topic:

> *"Um, I think when I had um a certain amount, not words actually, but when I saw that ok, I had many paragraphs, and I believed that they were enough for a 25-minute essay. I said ok, I got them most important findings from ChatGPT" (P3, l. 112-114).*

Thus, students used ChatGPT in a variety of ways to help them write the essay under the time pressure.

University's Support and Advice on AI

This theme describes the ways the university can support students to use AI in education. The vast majority of participants were positive towards the use of AI in universities and many suggested ways the university can support the incorporation of AI:

> *"I think the current like position of the university is quite good. I think there's no point in trying to ban it" (P5, l. 380-381).*

Additionally, some participants believe it would be useful if the university provided the paid version of ChatGPT:

> *"Maybe providing you know the premium version of ChatGPT, that sounds quite interesting" (P2, l. 349-350).*

Having workshops to teach the proper use of AI in universities was also a possible idea:

> *"Um, maybe some workshops to see, like from a professional and expert how exactly we can use it. And yeah, actually be in a class and see step by step the instructions, the moves or maybe do activities in class or with peers to see how can we practise on using AI? Or how can we evolve? I think yeah, through workshops would be good" (P3, l. 291-294).*

Lectures already provided by the university are helpful too:

> *"I think the university's been really helpful, like how they teach us to use it. They are cause I've had like, past the whole time and a half. I've had like, five to six different lectures from different areas on AI use and so teaching us about how to use AI is going to help people be more informed on like the guidelines of what to do and what not to do" (P7, l. 363-366).*

And participants advise using AI in essay planning, as well as understanding the content and also brainstorming:

> *"I think it would be more appropriate if ChatGPT was used as a guide for, I'd say more stuff like essay planning and maybe few definitions here and there" (P2, l. 245-246).*

However, a few participants did not consent with the idea that universities should support students to use AI, because they prefer to rely on their own ideas:

> *"I'm going to be honest, I would say no. Me personally, I would say no. Only because, so obviously I like to do my assignments straight away, get the best grades" (P8, l. 402-403).*

Summing up, many participants supported the idea of the university encouraging students on how to use AI properly through lectures and workshops. Nevertheless, some participants were against the idea that the university should support students to use AI because it reduces students' critical thinking and increased risk of plagiarism.

Survey Results

In the pre-survey, questions were asked to gain a baseline understanding of the participants and factors that may influence their performance on the essay task. In terms of having confidence in using academic English in their written work, 1 (44.8%) participant strongly disagreed that they were confident, 1 (4.8%) disagreed, 3 (14.3%) neither agreed nor disagreed, 8 (38.1%) agreed, and 10 (47.6%) strongly agreed. For having confidence in proofreading their work and checking their grammar, 1 (4.8%) participant strongly disagreed, 1 (4.8.%) agreed, 1 (4.8%) neither agreed nor disagreed, 8 (38.1%) agreed, and 10 (47.6%) strongly agreed. In writing and structuring essays and writing reports, 1 (4.8%) participant strongly disagreed, 1 (4.8%) disagreed, 2 (9.5%) neither agreed nor disagreed, 9 (42.95) agreed, and 8 (38.1%) strongly agreed. In terms of critical thinking, 9 (42.9%) participants strongly agreed, 11 (52.4%) agreed, and 1 (4.8%) did not answer. For having a good understanding on sourcing materials for essays and assignments, 1 (4.8%) disagreed, 1 (4.8%) neither agreed nor disagreed, 10 (47.6%) agreed, 8 (38.1%) strongly agreed, and 1 (4.8%) did not answer. With reliable internet being common everywhere, 18 (85.7%) participants said that they had reliable internet access through broadband/Wi-Fi while 3 (14.3%) participants said that they had reliable internet access through unlimited data. Participants were also asked about their use of AI and software tools in day-to-day activities. In terms of confidence using computer software packages, 1 (4.8%) participant strongly disagreed, 1 (4.8%) neither agreed nor disagreed, 12 (52.4%) agreed that they were confident, and 7 (33.3%) strongly agreed. For experiences with advanced internet platforms like eBay, ChatGPT, WordPress, and Squarespace, 1 (4.8%) participant strongly disagreed, 2 (9.5%) disagreed, 2 (9.5%) neither agreed nor disagreed, 11 (52.4%) agreed, and 5 (23.85) strongly agreed. They were asked if they had used ChatGPT before and 19 (90.5%) said yes, 1 (4.8%) said yes but used Gemini and not ChatGPT, and 1 (4.8%) said not really. An objective question was asked for what purposes did the participants use ChatGPT for and they responded stating that they used it for a range of purposes like academic and personal work, general knowledge, generating ideas and questions, proof reading and checking, improving clarity, day-to-day questions, recipes, summary questions and exams. In terms of helpfulness of ChatGPT to help their purpose, 1 (4.8%) participant said extremely unhelpful, 1 (4.8%) neither helpful nor unhelpful, 11 (52.4%) helpful, and 8 (38.1%) extremely helpful. They were also asked about their experiences with ChatGPT and the participants responded stating that it has helped them clarify doubts, explained topics, structured paragraphs, provided clear answers and helpful ideas, very time efficient, provided accessible information, plan essays and organise their life. To describe their proficiency with ChatGPT, 3 (14.3%) participants said that they were beginner users, 4 (195) novice users, 11

(52.4%) intermediate users, and 3 (14.3%) advanced users. With having used any other chatbots, 13 (61.9%) participants said yes while 8 (38.1%) said no. When asked to specify the other chatbots used, there were a range of responses like CoPilot, Grammarly, Monica, OtterAI, Gemini, Deepseek, Quillbot, Perplexity AI, and Snapchat AI, while some responded with n/a or none. Comparing ChatGPT to other chatbots, the responses from participants were that ChatGPT is better because it provides a range of functions and a more detailed and humanlike response, while some responded that CoPilot is better than ChatGPT at providing responses and that Quillbot is better at helping with essays. One response says that Deepseek is very similar to ChatGPT in terms of layout and user experience.

For classes attended since the beginning of the academic year, 1 (4.8%) participant said only a few, 3 (14.3%) said less than half of them, 14 (66.7%) said most classes, and 3 (14.3%) said all classes. For approximate amount of time spent on the internet on a typical day, the average time was M = 5.76, with timings ranging from 3 hours to 10 hours. Lastly, for the grade they expect to graduate their programme with 8 (38/1%) participants said 2:1, 1 (4.8%) said first or 2:1, 9 (42.9%) said first, and 3 (14.3%) said not sure. In the post-survey, questions were asked about their experience of writing the two essays. The first question was to know how difficult it was to write each essay. For the essay without AI, 1 (4.8%) participant found it extremely difficult, 5 (23.8%) found it very difficult, 9 (42.9%) found it slightly difficult, 2 (9.5%) found it neutral, and 4 (19%) found it slightly easy. For the essay with ChatGPT, 1 (4.8%) found it neutral, 8 (38.2%) found it slightly easy, 6 (28.6%) found it very easy, and 6 (28.6%) participants found it extremely easy. A paired samples t-test was conducted to test whether there was a difference on the perceived difficulty of writing each essay. Results showed that participants had more difficulty writing the essay without AI (M = 4.85, SD = 1.15) compared to writing the essay with AI (M = 2.19, SD = .93), $t(20) = 8.00$, $p < .001$), $d = 1.52$, 95% CI [1.97, 3.36].

The second question was to understand how much the participants enjoyed writing each essay. For the essay without AI, 1 (4.8%) participant did not enjoy it at all, 6 (28.6%) did not enjoy it very much, 8 (38.1%) were neutral, 4 (19%) enjoyed it a bit, and 2 (9.5%) enjoyed it a lot. For the essay with ChatGPT, 4 (19%) participants did not enjoy it very much, 7 (33.3%) were neutral, 4 (19%) enjoyed it a bit, and 6 (28.6%) enjoyed it a lot. A paired samples t-test was conducted to test for differences on the enjoyment of writing the essays. Results showed that participants enjoyed writing essays with AI (M = 3.57, SD = 1.12) more than essays without AI (M = 3.00, SD = 1.05), $t(20) = -1.78$, $p = .045$, $d = 1.47$, 95% CI [-1.23, .09].

The third and fourth questions were open questions to know what the participants found most difficult in writing each essay. For the essay without AI, most of students faced problems with recollection of relevant information. Some also had problems with structuring their essays and the time limit was an issue for a few participants. There were a few who stated that they did not face any difficulties despite not having access to AI or other external sources. For the essay with ChatGPT, a lot of the participants mentioned that using AI tools such as ChatGPT helped them a lot with retrieving information and structing their essay, but there were also some difficulties. Many participants were worried about plagiarism and writing it in their own style. Some found it difficult to assess the accuracy of the responses that ChatGPT provided. A few found it challenging to determine what to include and what not to. Overall, many participants found ChatGPT to be very helpful.

The fifth question was to know how familiar the participants were with using ChatGPT. One (4.8%) participant was not familiar at all, 1 (4.8%) was not very familiar, 3 (14.3%) were neutral, 9 (42.9%) were quite familiar, and 7 (33.3%) were very familiar. The last question was to know how often participants use ChatGPT. One (4.8%) participant said never, 4 (19%) said rarely, 7 (33.3%) said sometimes, 6 (28.6%) said very often, and 3 (14.3%) said very often. Prior to the experiment, participants were informed that their activity on the screen during the experiment would be recorded. After all the data were collected, the recordings were viewed and the questions the participants asked ChatGPT were all organised on an excel sheet.

To test the first hypothesis that essays written using ChatGPT will receive higher grades than those written without ChatGPT use, a paired-samples t-test was conducted. Results showed that the essays written using ChatGPT received a higher grade ($M = 61.2$, $SD = 14.2$) compared to the essays that were not written using ChatGPT ($M = 38.2$, $SD = 8.4$), $t(20) = 6.06$, $p < .001$, $d = 1.32$, 95% CI [15.1, 30.9]. To test the second hypothesis, that students who use AI for the first essay will score higher on their second essay, the difference score for each participant's essay with AI minus the essay without AI (irrespective of order) was calculated. An independent-samples t-test was used to test whether there was a significant difference in this difference score as a function of category (AI first or second). Results showed that the difference was significant $t(18.89) = 2.31$, $p = .016$, $d = .999$, 95% CI [1.46, 30.13]. The difference between the two essay grades was higher when the first essay was written using AI ($M = 30.6$, $SD = 17.1$) compared to when they used AI second ($M = 14.8$, $SD = 14.3$).

Additional analyses were conducted on the dataset. During marking, markers indicated their suspicion whether AI was used. A spearman's rho correlation was conducted to test whether a marker's suspicion of the use of AI influenced the grade they gave. Results showed that for both markers this was not the case, marker 1 (Spearman's correlation = -.01, $p = .531$) and marker 2 (Spearman's correlation = -.02, $p = .907$). Both markers showed high accuracy in their estimate of whether or not the students used AI. For marker 1, their suspicion was correct in 32 (76.2%) of the essays and for marker 2 their suspicion was correct for 35 (83.3%) of the essays. It should be noted that the majority of these suspicions of AI were noted when the marker saw that the student used quite some in-text citations and/or a reference list at the end. This could only have been added by the student when they used ChatGPT, this is not something the student would know by heart. If this is removed from the equation, the marker's estimate in whether ChatGPT was used or not dropped significantly, and it became hard to tell whether or not ChatGPT was used to write the essay.

A qualitative analysis was also conducted on the feedback the markers gave. Each marker gave strengths and areas for improvement on each essay and also ticked the relevant boxes on the rubric. In terms of the strengths identified by both markers, the markers revealed slightly varied opinions. Although both markers emphasised each essay's strong points, their written remarks had relatively little in common on average. This implies that when evaluating strengths, each marker concentrated on distinct components. Marker 1 prioritised particular examples or critical thinking, whereas marker 2 focused on structure or the scope of the topic. In terms of improvements suggested for the essays, both sets of comments were generally constructive, but often pointed to different issues. Marker 2 focused on academic writing or referencing, while marker 2 critiqued argument depth or scientific accuracy (which also links to academic writing). In relation to the rubric criteria of presentation, content and knowledge,

and answering the question, these were analysed one by one. The rubric scores for presentation showed consistency. In several cases, both markers rated presentation similarly. However, there were also instances where the scores differed. These differences appear to reflect variations in emphasis on different aspects of presentation. For example, marker 2 placed more weight on structural clarity, such as paragraphing and logical flow, while marker 1 focused more on grammar, sentence construction, or formatting. Overall, this category demonstrated a fair degree of agreement, with some variation across individual cases. The agreement in rubric cells for content and knowledge also varied. In many cases, both markers seemed to have a general consensus, but there were essays where marker 2 rated the content as "excellent" while marker 1 chose "acceptable" or "good." The overall pattern shows that while there was a reasonable degree of consistency, some variation was evident in how content quality was evaluated. Finally, the rubric cells for addressing the question showed relatively strong alignment between the two markers. In many cases, both markers assigned the same rating, indicating a shared understanding of whether the essay had responded appropriately to the question.

Students reported their expertise with AI through a self-reported measure indicating 'beginner', 'intermediate' or 'advanced' level of AI usage and expertise. A Kruskal Wallis test was conducted to determine whether level of expertise with AI influenced their grade on the essay the student used ChatGPT for. Results showed no significance difference between the grade they got on the essay where they used AI in relation to their AI expertise $H(2, 21) = .506$, $p = .777$.

Discussion

Since the implementation of AI tools like ChatGPT in the field of education, their usage has been increasing by both students and educators in various aspects. Hence, mastering the skills to use various AI tools has been shown to be effective and a bonus in both the short and long run, as knowledge on the use of AI tools has shown to be effective in academic work and a valuable skill in the job market. Therefore, the current study aimed to identify whether using ChatGPT helped students write their essays. It is to be kept in mind that the essays were on two different topics. In relation to hypothesis 1, which was that essays written using ChatGPT would be graded higher than those written without, it was found that students in-fact scored much higher when using ChatGPT compared to not using ChatGPT. This can be explained by ChatGPT helping provide detailed information, answering questions directly, and helping with generating ideas and brainstorming (Mahapatra, 2024). Despite not always providing accurate information, one can always cross-check with reliable sources. The participants also asked ChatGPT for links to papers for further clarification and help with writing their essays. For hypothesis 2, which was that students who used AI for the first essay would score higher on the second essay (without AI), the findings showed that students who used AI for the first essay, the difference between the one written with the AI and without the AI was higher than for those students who did not use AI for the first essay. This suggests that students did not take any knowledge from the AI with them for the 2nd essay and it perhaps also shows that their confidence was lower when the AI was taken away. The findings of this study that students write essays better with the use of AI tools like ChatGPT aligns with prior research done in this field (Huang & Tan, 2023; Khampusaen, 2025; Mahapatra, 2024). A study by Quratulain, Maqbool, and Bilal (2025) explored the use of AI tools to improve essay writing, and the results showed that the use of AI writing assistants had a positive impact on writing in terms

of accuracy, structure, and self-revision. Another study by Sultan, Taj, Sabir, Ali, and Qureshi (2025) investigated the impact of ChatGPT on undergraduate students in their writing abilities, focusing on its effects on grammar, vocabulary, coherence, and structural organisation. They found that ChatGPT helped students in their writing capabilities, especially when working with academic assignments.

The qualitative findings highlight the personal views of participants on how ChatGPT helps them in their academic life, and they can be linked with studies that have come to the same conclusion. Among the variety of responses stated in the interviews, many claim that ChatGPT has helped them greatly in notetaking, comprehending lecture material, providing support for academic work, clarification for difficult terminology, help with grammar, and formation of sentences (Khampusaen, 2025; Mahapatra, 2024; Wang et al., 2024). Yan et al. (2023) found that ChatGPT was an ally for thematic analysis, coding, data exploration, quantitative insights, and assisting comprehension. Hadi, Mohamad, Johar, and Kadir (2024) also found that ChatGPT was easy and useful to use in academic writing. However, some participants also stated that ChatGPT tends to have lack of precision in its responses, while others are even worried about being flagged for plagiarism for using ChatGPT in their academic work (Esmaeil, Maakip, Kiflee, Marshall, & Matanluk, 2023; Kronivets et al., 2023; Veras et al., 2024; Yan et al., 2023)

As stated previously, ChatGPT is a very useful tool which can benefit both educators and students. Its use has been increasing in the past couple of years. It helps in improving students' academic skills and knowledge and helps in exploring new ideas and concepts (Kuleto et al., 2021; Malik et al., 2024). But it is important to keep in mind that ChatGPT must be used properly and ethically so as to not be signalled for academic misconduct or plagiarism (Kronivets et al., 2023). Universities must make it a requirement to inform students on the safe use of ChatGPT and the consequences of misuse. Overall, the development of ChatGPT has shown to be a remarkable resource, and further evolution of ChatGPT will forever change the education sector.

Recommendations

Given the positive impacts that ChatGPT has had on students' academic learning, there are certain practices that could be incorporated which can help students utilise the full potential of AI tools. One such practice is by using AI teachers as supplement to human teachers for students so that they will be able to use them when the human teachers are unable to help, such as outside of working hours (Aditya et al., 2024). A study by Otermans, Baines, Pereira, Livingstone, and Aditya (2024) aimed to explore the perspectives of parents in integrating AI tools in their children's learning and their results showed that parents would allow their children to use these tools and believed that they will learn quicker with information provided by AI. Universities could also implement a module related to AI or distribute AI literacy education throughout modules so that students have a base understanding on the development of AI and how they can use those resources to help with their academic work (Thomson et al., 2024). It must also be considered that many AI tools that offer a better/premium version, but users have to pay for them. For example, ChatGPT offers a ChatGPT Plus version which is more accurate, fluent, and nuanced, and costs $20 per month (approx. £15.74 per month). Universities could offer these premium versions for free for students (through their registered student emails). This would help students with their assignments/studying

experiences and help them boost their AI knowledge and skills. It would also help to avoid disparities in access due to differences in the ability to pay. Another practice is having assignments/assessments that require students to use AI which can help them explore the vast varieties of AI tools, as assessments play a key role in students' academic experience at HE and having an assessment which requires the use of AI would be an added experience (Otermans, Livingstone, Nasar, Tree, & Baines. 2025; Otermans & Baines, submitted). This helps students to learn and receive feedback in their development of AI literacy.

Limitations and Future Research

There are certain limitations to this study. First, the study was conducted on a sample of 21 participants, which is not a large population to conduct a study on. Large sample sizes are always beneficial, but when the number is limited, small sample size can provide reliable solutions (de Winter, Dodou, & Wieringa, 2009). Second, in the essays that required the use of ChatGPT, there was no rule for plagiarism. Hence, there were participants (14 out of 21) who copy-pasted the responses that ChatGPT provided directly into the essays and later edited them. This method would not be allowed in normal academic circumstances (although markers cannot provide evidence that submitted assignments are copy/pasted from ChatGPT), and individuals would get penalised for that. However, if the markers thought the content was directly copy-pasted it from ChatGPT, they would take that into account in their holistic grade. Those essays tended to be graded lower due to factors such as poor structure or incomplete argument. Third, there was a 25-minute window to write each essay. Many students may not prefer such a tight timeframe as this negatively effects their writing capabilities and therefore has a detrimental effect on their performance (De Paola & Gioia, 2016; Moore & Tenney, 2012; Ramadhani, 2024). However, such a time-pressured task mimics real-world graduates tasks where employees may be asked to deliver a particular task in a very tight time window (e.g., "I need this report on my desk by end of the day").

For future research, to get a more clear and accurate result on the effectiveness of ChatGPT on essay writing for students, a larger and more diverse population would be a viable option. Most university assignments (essays and/or lab reports) tend to publish the coursework topic weeks or months before the deadline. Hence, students tend to have more time to work on their assignments. Since this exact method is not possible because it would defeat the purpose of the study and would be very time consuming, a more relaxed and flexible time window would be an appropriate way for a better data collection process.

Conclusion

AI has radically transformed the academic domains and has changed our ways on retrieving, interpreting, and utilising information in educational settings. This paper explored the effectiveness of ChatGPT on essay writing for university students. The findings indicated that ChatGPT has overall helped and supported participants in writing their essays in terms of quality, structuring, and answering the question. In the post experiment survey, most participants claimed that they found writing the essay easier and enjoying when they used ChatGPT. This aligns with the hypothesis that students would score higher grades when writing essays with ChatGPT compared to without using ChatGPT. HEI have been changing over the last couple of years and will be changing in upcoming

years (Otermans et al., 2025). As AI continues to evolve at an accelerated rate, there is no doubt that HEI will have to keep up with it and implement AI more in teaching and learning as well as assessments, ensuring that learning may take place via an AI-focused world. However, despite AI providing many benefits, it is to be noted that AI is a very important and useful tool and that it is open to be misused intentionally or unintentionally which would lead to ethical consequences like plagiarism. Hence, it is important for academic institutions to establish strong ground rules on the use of AI and ensuring that students are aware of the grounds of the consequences of misuse.

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