

Discussion of the Application of ChatGPT in University Learning

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Abstract. The introduction of ChatGPT has attracted attention from a wide range of academics, and many scholars have conducted research and evaluation on it. This article will focus on the application of ChatGPT in university learning, first listing various applications, and then discussing and evaluating these applications comprehensively and critically. For students, ChatGPT can be used for text generation, translation, grammar calibration, information filtering, and individualised learning, while teachers can utilise ChatGPT to devise courses and quizzes. ChatGPT excels in efficiency and convenience, but it is also crucial to be vigilant of the drawbacks and ethical issues of ChatGPT when using it, such as low-quality answers, risks of undermining students' learning abilities and exacerbating educational inequality, as well as privacy leakage, and the impact of biased data. Therefore, this article suggests that users should be cautious in using ChatGPT and improve their learning abilities, while ChatGPT still needs to improve its own system functions.

Keywords: ChatGPT; education; university learning.

1. Introduction

With the continuous transformation of electronics and information technology, technology has a growing presence in contemporary society. It is not only ubiquitous in people's daily lives but also can be linked to various academic and professional fields. For example, in the medical field, doctors may need patients to have a brain CT to identify what the disease is. There are numerous types of artificial intelligence (AI) and their development is becoming increasingly rapid. ChatGPT is a Natural Processing Language model (NPL) developed by OpenAI in 2019 and officially released in September 2022. It is also an AI language model [1]. The usage of ChatGPT relies on users asking questions, and ChatGPT can generate text that is highly similar to human writing based on its algorithms for response [1]. The introduction of ChatGPT has caused a great uproar in various sectors of society, as well as in the education industry. Education is an all-encompassing term, and a straightforward way to categorise it is by age groups, usually divided into kindergarten, primary school, middle school, high school, and university. Many scholars have conducted specialised research on ChatGPT, exploring its diverse and potential uses, which seem to be more applicable to the learning of college students. Moreover, compared to the previous stages of learning, university learning places more emphasis on self-directed learning, as university teachers tend to teach students the key points of the curriculum, and students need to conduct their own in-depth exploration of knowledge. At this point, ChatGPT can serve as an ideal learning aid tool. Hence, this article will study how ChatGPT is applied in university learning and present a critical analysis and evaluation. This research paper aims to help readers understand the uses of ChatGPT, expand their learning methods and improve learning efficiency, and explore how ChatGPT should be used appropriately.

2. Application of ChatGPT in the University

2.1. For Students

2.1.1. Text generation

One of the key functions of ChatGPT is text generation, and this function is well-understood. The users ask questions to ChatGPT, and ChatGPT will provide text answers. Lund and Wang mentioned two important concepts in their paper, namely the generative model and the language model [2]. The



generation model refers to a model that generates new data, rather than simply classifying or predicting the input data [2]. A language model is an artificial intelligence model that, after training and practice, could generate text similar to human language [2]. Therefore, these two models can complement each other, generating data from the model and then undergoing complex programs to convert the data into human language. Curtis pointed out that text generation is likely to have a significant impact on academic creation, for instance, some students or scholars may seek inspiration from ChatGPT when writing journal papers [3]. ChatGPT can even produce text with a specific style or tone after multiple adjustments, such as users providing examples, which greatly improves the efficiency of some students or scholars in completing written materials [4].

2.1.2. Translation

ChatGPT is also a chatbot with multilingual capabilities. When referring to language and translation, the concept of NPL has to be explained, which is the use of large amounts of data to textually respond to agents' questions, feedback, and prompts. Cotton et al. claim that GPT-3 has been shown to be able to achieve high levels of accuracy in translating between multiple languages, with logically coherent content and long document lengths [5]. Thus, ChatGPT can be regarded as a new translation tool for students when completing assignments in non-native languages. Lai et al. also discovered that GPT has been shown to be exceptionally accurate in translating languages such as Thai, Vietnamese, and Bulgarian, and one reason for this is that these are medium- or low-resource languages, which can be interpreted as a sign of the lower difficulty of grammatical and semantic reasoning in these languages [6]. Nevertheless, it is worth noting that ChatGPT's main language of use is English, the accuracy when using other languages is still debatable, and the quality of ChatGPT's translations is also affected by the different areas of specialisation in which they are used.

2.1.3. Grammar and spelling

ChatGPT accepts most of the textual data in a language that is basically English, so it is particularly well-equipped to help users check out errors in grammar, spelling, punctuation, and even content inconsistencies in English texts [7]. Furthermore, slightly different from translation, grammar, and spelling are more objective, whereas the quality of the translation may be influenced by cultural differences between languages. Wu et al. evaluated ChatGPT, Grammarly, and a state-of-the-art model (GECToR) with respect to the Grammatical Error Correction Task, they found that ChatGPT's performance was relatively weak, especially in long sentence correction, as well as a problem of overcorrection [8]. Students may use ChatGPT as an aid to check for grammatical errors when completing their essay assignments.

2.1.4. Literature search

Students can dramatically increase their efficiency by using ChatGPT to filter the literature while writing a dissertation. The amount of time to be consumed for the review as a pre-preparation is uncertain, and some reviews for dissertations with ambitious topics may even take months to complete. However, ChatGPT's literature search function is theoretically advanced because it can search for relevant literature based on topics or keywords assigned by the user and provide a list of papers [2]. Haman and Školník investigated the utility of ChatGPT for literature searching, and in total, they requested fifty papers from ChatGPT, of which only eight had DOIs and seventeen papers actually existed in the database [9]. It can be seen that the literature search function of ChatGPT is not satisfactory, and much of the literature given is fabricated, which is highly deceptive.

2.1.5. Individualised learning

Individualised learning is another outstanding extension of ChatGPT. According to Fuchs, individualised learning refers to customising the teaching and learning curriculum to the unique needs, abilities, and interests of the learner [10]. This approach can stimulate learners' interest and engagement, and tailoring lessons to learners' individual needs can help them grasp the subject matter faster and gain a deeper understanding of what they are learning. NPL models are also relevant to personalised learning, as ChatGPT relies on NPL to analyse a user's learning needs and create a

detailed learning plan and assessment methodology. For example, after a learner completes a ChatGPT question, ChatGPT will analyse the learner's response and assess the learner's mastery of the topic in order to determine how to assist the learner in reinforcing it [10]. In addition, before learners approach a new course, they can ask ChatGPT questions to acquire an initial understanding. ChatGPT can be viewed as a personal tutor, which, as Cotton et al. suggest, can offer learners with a proper and interesting learning model [5].

2.2. For Teachers

2.2.1. Curriculum design

The main benefit of curriculum design is for teachers and schools. As the students use ChatGPT to learn and summarise the key points of their knowledge, the teachers can also use ChatGPT's extensive database as a reference to create a course syllabus and organise the different sections of the course into sections. Teachers present ChatGPT with a predetermined course topic and then list more detailed design needs, such as the purpose of the course, background information, and time planning, and ChatGPT is capable of constructing a complete report of the course. One participant interviewed in Tlili et al.'s study indicated that he used ChatGPT for the purposes of both learning assistance and instructional design [11]. For the second, ChatGPT outlines a syllabus that reminds the instructor of the knowledge and skills that should be included in the course. Additionally, ChatGPT's online resource library may be more thorough than the teacher knows, so its course design will be more comprehensive. Lo mentioned in his paper that ChatGPT's suggestions for course design for special education students are effective as well [12].

2.2.2. Assessment and evaluation

ChatGPT can assist teachers in devising and refining test assessments. ChatGPT can be employed as a new interactive classroom tool that can efficiently and quickly create simple classroom quizzes to assess student learning. Kasneci et al. explain that ChatGPT can help teachers semi-automatically grade students' assignments such as essays or other written assignments [13]. On the one hand, it saves considerable time so that teachers can focus on other more important matters, and on the other hand, ChatGPT, an AI language model, can accurately analyse and identify the learning difficulties encountered by students, helping teachers to better understand the level of student's mastery of knowledge. Moreover, the new version of ChatGPT is also able to assess and score students' work more quickly and accurately, thus delivering more timely feedback [5]. However, Kasneci et al. emphasise that ChatGPT's performance in helping students is still significantly worse than that of humans [13]. Similarly, Lo highlighted the shortcomings of ChatGPT in generating tests that do not cover all the targeted learning objectives [12].

3. Discussion

After enumerating the applications of ChatGPT in university learning, the third section will provide a critique of these applications, elaborating on the strengths and weaknesses of ChatGPT's use in university learning, respectively. In addition, the ethical concerns related to the usage of ChatGPT will also be discussed. Finally, this section will explain how exactly ChatGPT should be used correctly and how to avoid negative impacts.

3.1. Advantages

One of the prominent advantages of ChatGPT is its efficiency. When a user poses a question, it can immediately respond with a complete and appropriately worded answer. Learners do not have to revise the whole text to summarise the main points of the course and study notes, and they do not have to read plenty of literature when writing a paper, because ChatGPT can intelligently filter based on the keywords and topics directly, which saves a great deal of time for the students. Furthermore, because users work one-on-one with ChatGPT, rather than in a traditional classroom where there is

only one teacher and a number of students, learners can receive quick responses to their questions without having to wait for the teacher to answer other students' questions.

Bin-Hady et al. in their paper mentioned the intimate connection between ChatGPT and scaffolding learning [14]. Vygotsky, a Soviet educator, was one of the key theorists in developing the educational concept of scaffolding, which is often associated with the Zone of Proximal Development (ZPD) [15]. ZPD is a child's ability to perform tasks that could not be done independently after having their potential stimulated under the guidance of an adult or a more capable peer [15]. Scaffolding learning, then, refers to the temporary supportive role of an adult or more capable peer in a learner's learning process to help the learner reach his or her breakthrough potential [15]. ChatGPT is one of the powerful tools of scaffolding learning, which is evident in the use of individualised learning, where ChatGPT can assist the learners to familiarise themselves with a concept in a step-by-step manner, which in turn generates exercises based on the learning situation for consolidation purposes.

Bishop suggests that ChatGPT's translation capability can promote educational equality [4]. Native and second language transitions may result in different semantics, preventing students from accurately expressing themselves in their papers, but ChatGPT's translation polishing is more natural and authentic. Thus, Bishop argues that ChatGPT can solve the problem of language barriers by putting non-native English-speaking students and native English speakers in an equally competitive environment [4]. Apart from that, ChatGPT can also provide additional learning support for those students whose families are relatively not so affluent and cannot afford the cost of tutorial classes. Even though there is a charge for GPT-4, the fee is much lower compared to that of tutorial classes. Hence, ChatGPT enables students from the working class to have access to more educational resources, and to a certain extent, it can narrow the disparities brought about by the class, which enhances equality in education.

3.2. Disadvantages

To be honest, the drawbacks of ChatGPT are substantial and non-negligible.

To begin with, the quality of ChatGPT's responses is questionable. Tlili found that ChatGPT's answers occasionally contain errors and even misleading information [11]. One of Tlili's research respondents indicated that the quality of ChatGPT's responses may depend on the quality and narrative of the questions asked by agents [11]. Nonetheless, this can cause inconvenience and distress to the users, and the questions they ask may not be addressed effectively. For example, when students seek literature for essay writing from ChatGPT, some of the literature listed by ChatGPT is not actually available but fabricated, and unreliable information might cause academic misconduct [9]. Additionally, ChatGPT constantly makes up for itself when it is found to have inaccurate information in its answers. In an extended way, such unreliability and dishonesty of ChatGPT may also have a negative impact on learners, especially young learners. Some students may imitate ChatGPT's behaviour and use dishonest excuses to lie to their teachers in order to avoid learning and assignments. Lecler, Duron, and Soyer observed that the content of ChatGPT's responses occasionally suffered from logical flaws, which could be attributed to a lack of contextualisation or a lack of specialist domain knowledge [7]. Therefore, it in turn requires the user to spend extra time checking for calibration. For teachers, Tlili found that the difficulty of the quizzes generated by ChatGPT is not definite and that sometimes the questions generated are so simple that incorrect answers can be recognised immediately, which also adds to the teacher's responsibility to calibrate the validity of the questions [11].

Students' over-reliance on ChatGPT may impair their study skills. For students, abuse of ChatGPT can be detrimental to their ability to think critically and be creative. As described above, ChatGPT can provide students with thoughts for essay writing, and literature screening, and ChatGPT even has the ability to complete a full essay, which, despite some irrationalities, is still informative [2,3]. Some students may choose to use ChatGPT for their assignments out of laziness or time pressure. ChatGPT's quick and precise responses greatly simplify the acquisition of information, and students

will not refine their critical thinking skills by doing their own in-depth thinking and analysis of the assignment [13]. Moreover, if students complete their assignments with ChatGPT, the teacher probably will fail to identify which part of the assignment is the student's own idea and which part is the output of ChatGPT, and thus will be unable to detect the student's real learning situation and level. Then, the teacher cannot give accurate feedback to tell the students where to improve, and the students cannot make progress.

ChatGPT, as an AI language model, also has a common shortcoming, which is the lack of emotion. At the end of a lesson, teachers sometimes ask students to write a reflective summary, and teachers can use this feedback to adjust or improve their teaching. However, ChatGPT also acknowledges its inability to perceive emotions as an AI machine [11]. As a result, ChatGPT is unable to give feedback on student engagement and thus has no way to make adjustments.

The existence and use of ChatGPT also pose the risk of exacerbating inequalities in education, because ChatGPT, as an online chatbot, requires the use of an electronic device as a medium, and requires users to have digital literacy. This is unjust for some students from deprived backgrounds, it is because their families may not have the financial conditions to support them to have and use their own electronic devices. Therefore, the educational resources that ChatGPT provides are also not accessible to all. Furthermore, Tlili et al. showed in their study that when three educators asked exactly the same questions through the same university network, the quality of the content of the responses received varied, with one having updated and well-structured information data and the other two not [11]. This implies that there is also an inequity in the quality of the learning resources presented by ChatGPT, which does not ensure that all users have access to the same quality of information, but the exact reasons for this are still debatable. Most of the research on the design of ChatGPT has been conducted in English, so it is possible that using ChatGPT in English will yield more accurate information and a larger database [13]. Consequently, the design of ChatGPT is also inherently more favourable to English-speaking users, while non-English-speaking users may not have equal access to this educational technology.

3.3. Ethics

There are some ethical considerations that should also be included when using ChatGPT.

One of the most salient ethical issues in using ChatGPT is academic misbehaviour. According to Eke, the International Centre for Academic Integrity defined academic integrity as these characteristics, honesty, trust, fairness, respect, responsibility, and courage [16]. On the one hand, students who use ChatGPT in their assignments, e.g., substantially adopting ChatGPT texts or ideas as their original thesis assignments, violate the principles of honesty and trust. On the other hand, the text generated by ChatGPT may contain copyrighted content, and students who employ it unknowingly when writing their papers violate the principles of respect and responsibility and even risk violating laws and regulations [2]. Additionally, copyright is a very complicated issue, and there is uncertainty as to whether the content generated by ChatGPT should be regarded as its original work or that of other literature it references as a basis, so the source of the infringed copyright is unclear. The emergence of ChatGPT poses a great threat and challenge to academic integrity, especially in terms of plagiarism. Improper use of ChatGPT by students may be labelled as academic misconduct, and in serious cases, even the risk of dropping out of the university. Further, this type of academic misconduct may have a negative impact on the academic publishing community, as it could lead to a proliferation of plagiarised or low-quality papers, as well as a devaluation of the skills and expertise required to produce high-quality academic papers [3].

Apart from that, ChatGPT may expose users' privacy. Some users, particularly the younger ones, may unconsciously share their privacy with ChatGPT when engaging in conversations with it. Tlili et al. found that on OpenAI's official website, the FAQs about ChatGPT contained conversations between ChatGPT and some users [11]. Although these dialogues are used to review to improve the

system, it also proves that users' chats with ChatGPT may be saved and there is a danger that personal information given by users in the chats may be leaked without their knowing.

Another serious ethical problem with ChatGPT is bias. According to Ray's paper, ChatGPT's training data is mainly drawn from the Internet, so some of the dominant views and cultures of the Internet may be perpetuated in ChatGPT, e.g., ChatGPT will associate certain occupations with specific gender or ethnic groups [17]. Kasneci et al. raise a similar argument that the response functions of AI language models such as ChatGPT are trained with data from the general public population, but do not include all populations, such as ethnic minorities or socially marginalised groups, which likewise leads to the problem of bias [13]. ChatGPT's responses may contain such biases, and the receiving users may also inadvertently reinforce stereotypes about gender, race, or other topics, and in turn, unobtrusive inequities in society may be perpetuated.

3.4. Strategies for ChatGPT

In order to increase the utility and usability of ChatGPT, preventing plagiarism in papers, improving students' learning skills, and refining the functionality of ChatGPT's own system should be emphasised.

Paper writing is only one of the means of examining the students' learning ability, the core purpose of learning is the skills that the students should master. Shidiq believes that the teacher should focus on the development of the student's creative writing skills, which is not only related to creativity but also requires the learner's logical ability and aesthetics [18]. To develop creative writing skills, the teacher should concentrate on the communication and interaction between the students and the teacher [18]. To strengthen and test students' problem-solving, critical thinking, and communication skills, teachers can also transform their assessment methods by requesting more group discussions or impromptu speeches instead of the traditional method of asking students to submit written papers [5]. Transforming the assessment method on the one hand makes it more difficult for students to use ChatGPT for their assignments, and on the other hand, when students have improved their skills in these areas, they will be more considerate and more careful when using ChatGPT.

Finally, the ethical considerations related to ChatGPT still need to be addressed by its own system updates and improvements. OpenAI should emphasise the issues of privacy leakage and data bias. As an example, users' consent should be explicitly sought before saving ChatGPT's dialogue with them for system improvement. In addition, when inputting data for training ChatGPT's responses, technicians should try to expand the data about the range of groups so that minorities and socially marginalised groups are not overlooked. ChatGPT, as an AI language model, should be as objective as possible in its output answers, particularly when discussing sensitive topics, such as politics, gender, and race, so as not to raise ethical and moral issues or exacerbate social inequalities. The problem of the variable quality of ChatGPT's responses also remains to be rectified, and one way to deal with it is to add more professional knowledge data to ChatGPT's database, so as to ensure that ChatGPT's answers are of high quality.

4. Conclusion

ChatGPT has been tied to the field of education in a variety of ways, including its use in university studies, with both students and teachers being the beneficiaries. For students, ChatGPT enables them to have a rough preview before the class and receive an effective summary at the end of the class, improving the efficiency of personalised learning. ChatGPT can also act as a useful tool when students are working on their assignments, including providing ideas for essay writing, filtering for literature that can be cited in the essay, as well as polishing up translations and grammar for the essay. Teachers can utilise ChatGPT to create course syllabi and design assessment quizzes for their students. ChatGPT is convenient and efficient in responding to and solving problems posed by users. ChatGPT can also act as a virtual teacher to support the scaffolding of students' learning, and to some extent it can narrow the gap between rich and poor students, and between native and non-native English

speakers, to achieve educational equality. However, it is undeniable that there are many flaws in ChatGPT. The varying quality of ChatGPT's output may cause inconvenience to users. The misuse of ChatGPT may not only impair students' learning ability, but also cause large-scale academic malpractice, resulting in the proliferation of low-quality and plagiarised papers, and damaging the trust of the academic community. ChatGPT, as artificial intelligence, is not sensitive to emotions and thus is unable to offer effective feedback to learners in some cases. ChatGPT has the potential to exacerbate inequalities in education, as its usage requires the possession of an electronic device and digital literacy, which is not always applicable to children from economically disadvantaged families. Except for that, ChatGPT has been identified with some ethical problems, which are academic misconduct, privacy, and bias. Confronting the drawbacks and ethical considerations of ChatGPT, some countermeasures are also proposed in section 3.4 of this paper, which covers the prevention of plagiarism, the enhancement of students' learning ability, and the urging of ChatGPT to make self-adjustment. This paper focuses on the use of ChatGPT in university learning, and students and teachers can develop various uses of ChatGPT according to individual needs. Nevertheless, it is vital that people should learn how to use ChatGPT properly and should be alert to the negative social influence of ChatGPT. Due to the length limitation of this paper, the description of each application is shallow and not very detailed, which may make the reader's understanding not deep enough. The emergence of ChatGPT indeed contributes considerably to the convenience of university learning, and it is a very valuable study aid tool. In the future, however, more research should investigate the ways in which ChatGPT can improve itself, protect the privacy of its users, and collaborate with official organisations to determine a reasonable range for students to use ChatGPT in their studies.

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