"Completely Deprive My Rights to Think": Analyzing Student Perspectives on the Usefulness of ChatGPT and Its Impact on Higher Order Thinking Skills

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Abstract. This study aims to examine the perceptions of modern university students on the utilization of ChatGPT and its impact on their higher order thinking skills. The experiment was conducted in a top-tier university with robust academic capabilities in Shandong, China. Through a 40-minute English speaking class combined with classroom observation and semi-structured interviews, this research found that 1) University students hold positive attitudes towards the efficiency of ChatGPT, but they encounter challenges in devising input prompts; 2) The use of ChatGPT may lead to the weakening of students' subjective thinking abilities, consequently restricting the development of their higher order thinking skills.

Keywords: Students' perception; ChatGPT; Education; Higher order thinking skills.

1 Introduction

The rapid modernization of Artificial Intelligence (AI) has revolutionized various domains of human society, including the education. With the advent of new generative AI, there rise a lively discussion about the usefulness of generative AI in higher education. Some scholars, though, worried about the challenges include generating incorrect information and plagiarism, necessitating updates to assessment methods and policies (Lo, 2023) [1]. Research suggests that ChatGPT could be a helpful tool for both teachers and students (Javaid et al., 2023; Hong, 2023) [2-3].

The cultivation of competencies, particularly higher order thinking skills, holds considerable significance within the education continuum. Higher order thinking skills has potential to enhance students' abilities in understanding and problem-solving (Singh & Marappan, 2020) [4]. The development of higher order thinking skills contributes to the formation of a high-quality citizens for the construction of the community. Therefore, it is important for both individual growth and societal progress. In the current context of controversial development of generative AI, the impact of generative AI on students' higher order thinking skills becomes a question worth exploring.

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This study mainly focuses on the perception of students regarding the usefulness of generative AI and its role in developing higher order thinking skills. It adopts a production-oriented approach within a classroom setting, wherein students engage in a role-playing session using ChatGPT. Following the session, students shared their experiences of using AI in the semi-structured interviews.

2 Literature Review

2.1 The Application of ChatGPT in Education

Studies show that ChatGPT's application in education exhibits general characteristics that mainly include: 1) personalized instruction for students; and 2) objective perception of the use of ChatGPT.

The findings indicate that the generative AI can provide personalized support to foreign language learners because it usually has knowledge of a particular subject. For example, intelligent tutor systems are used in Massive Open Online Courses platforms to provide guidance to students at different levels (Huang & Li, 2023) [5]. Some scholars from Korean examines effectiveness of ChatGPT in teaching business English writing to intermediate-level Korean ESL learners. Results demonstrate that it is potential for enhancing learning experience (Kim et al., 2023) [6].

Furthermore, students assess the utility of ChatGPT in an objective manner. A study suggests that senior students in a computer engineering program found ChatGPT interesting, motivating, and helpful (Shoufan, 2023) [7]. Some of them noted its efficiency, specifically in terms of time-saving capabilities and its ability to provide information across diverse domains. However, some were also skeptical about its accuracy (Ngo, 2023) [8]. Significantly, morality is also an important issue which students concern. A study by Farhi et al. (2023) elucidates that students are cognizant of the ethical dilemmas presented by an excessive dependence on AI tools, suggesting the need for a balanced approach to technology integration [9]. Furthermore, research conducted by Bin-Hady et al. (2023) highlights the utility of ChatGPT as a pedagogical scaffold that enhances language acquisition among learners [10]. Students just need such complex scaffolding assistance to cultivate sophisticated critical thinking (Exintaris et al., 2023) [11].

Based on the above background, this article finds that there is still room for in-depth exploration of this topic since few scholars in previous studies have thoroughly investigated the impact of generative AI on students' higher order thinking skills.

2.2 Higher Order Thinking Skills (HOTs)

The academic community has historically regarded the conceptualization of Higher Order Thinking (HOT) as a complex and challenging endeavor. Lewis & Smith (1993) aptly described this conceptual morass, acknowledging the difficulties inherent in delineating the contours of higher order thinking [12]. They proposed a definition suggesting that higher order thinking manifests when an individual engages with new information, synthesizes it with existing knowledge, and employs this integrated understanding to navigate ambiguous situations or to accomplish specific goals (Ibid).

Building on this definition, scholars have examined the assessment of higher order thinking. Using vivid examples, Brookhart (2010) presents a framework for assessing higher order thinking skills in his book [13]. Guided by three principles and incorporating Bloom's cognitive taxonomy, he argued that this skill should be assessed in the following five categories: Analysis, evaluation, and creation; Logical reasoning; Judgment and critical thinking; Problem solving; and Creativity and creative thinking. Based on this framework, to make the behavioral analysis of this study more precise, this study has made some appropriate modifications.

3 Research Questions

This study raised the following two research questions.

Research question 1: How do students perceive the usefulness of generative AI in the class activity of discussion and role play?

Research question 2: To what extent do generative AI develop students' higher order thinking skills?

4 Research Design

The study follows an action research designer. Totally six students participated in the study. All of them are students in the dual degree program in English Literature and International Politics from Shandong University, a leading educational institution in China. They were divided into two groups (A & B) and all the presented names are pseudonyms. All participants provided informed consent before their involvement in the study.

The research conducted a 40-minute-long oral English class, in which both group A and group B were allowed to use ChatGPT. The class commenced with introduction to the comparison between *Zhuangzi* (Representative of Chinese Taoist Philosophy) and *Confucius* (Representative of Chinese Confucian Philosophy) regarding disabilities. Subsequently, students were asked to give a performance based on the scenario below:

At a beautiful afternoon, you met an American ballet dancer in the coffee shop. Unfortunately, she is paralyzed due to a car accident last year and now really depressed. So, if you were Zhuangzi and Confucius, what will you say and do? Recreate the above scene in your group by playing the roles of a ballet dancer, Zhuangzi, and Confucius. And you will have 10 minutes to prepare and 3 minutes to perform.

4.1 Class Observation

The utilization of classroom observation offers an authentic and objective perspective of students learning interests, difficulties, and reactions to teaching content.

4.2 Semi-Structure Interview

In this study, participants were interviewed in groups at the end of the experiment. The interview questions were prepared in advance, with additional questions tailored to their varied performances throughout the experiment.

5 Research Findings

Based on classroom observations, group A performed better than group B. There were significant differences between the two groups in terms of time allocation and methods of using the ChatGPT, which were the reasons for the difference in performance between the two groups.

5.1 The Allocation of Time and the Way to Use ChatGPT

Fig. 1. Time allocation of the two groups.

The study observed and showed in Figure 1 that group A spent 56% of their time in analyzing the scenario while Group B spent 68% of their time in analyzing scenario and coding it into a prompt for ChatGPT. Table 1 shows what exactly Group A and Group B did during the preparation time for each period.

Table 1. Specific work of the two groups at different time periods.

Time	Group A	Group B
0-2mins	Analyzed the scenario	Analyzed the scenario and the attitudes of the two philosophers
3-5mins	Practiced creating scenarios and generating questions	Translated the thoughts of the two philosophers into instructions to be entered into ChatGPT
6-7mins	Asked ChatGPT about Confucius' thoughts on people with disabilities	Modified the instructions
7-9mins	Analyzed the scenario again combined with what ChatGPT gave	
9-12mins	Practiced creating scenarios while using ChatGPT to modify language accuracy	Practiced memorizing the script given by ChatGPT

There was exactly a difference in the way they used ChatGPT. In Group A, they used ChatGPT by asking simple questions, e.g., how would Confucius comfort a disabled person. They used ChatGPT as a translation, either. In Group B, students used ChatGPT by giving it a more specific prompt which combine the scenario with their understanding of the two philosophers' ideas. The following Figure 2 is a screenshot of the two groups asking ChatGPT for specific questions.

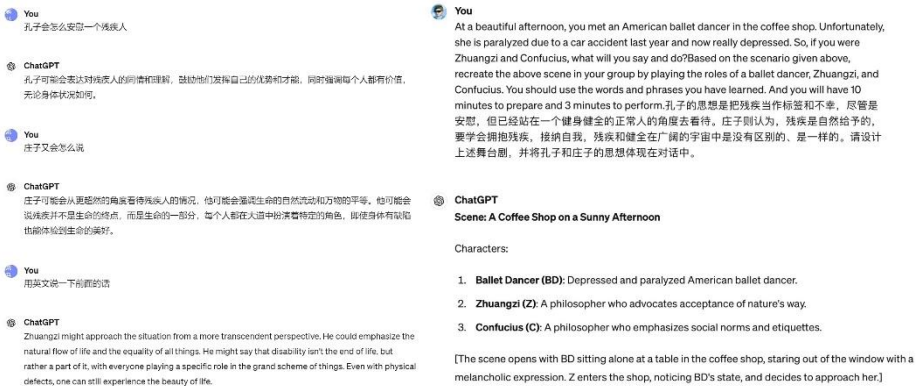

Fig. 2. Different ways for the two groups using ChatGPT.

5.2 Perceived Usefulness of AI

Group A.

Students from Group A felt that ChatGPT could be useful in terms of information provision and advanced vocabulary. The following assessment from Saidy shows that some students believed GPT was extremely useful in terms of the providing information and answering questions.

- *"It serves as a valuable tool for gathering information and insights from the perspectives of Confucius and Zhuangzi. When paired with scenarios, it offers a comprehensive script, greatly enhancing convenience."* (Saidy).

Group B.

Students in Group B thought that ChatGPT could help users in terms of efficiency.

- *"After giving it a prompt, it generated a very informative and effective content, including each character's lines, tone of voice, and expressions."* (Greenwood).

5.3 Perceived Limitations of AI

Group A.

Group A students had problems with prompt input.

- *"We wanted to get a conversational thing, but we didn't know how to do to let ChatGPT give useful information to us."* (Wendy).

Wendy's answer shows that some students were confused about the using of generative AI which indicates that guidelines of using the tool is necessary for ChatGPT to provide.

Group B.

In Group A, ChatGPT did not play a role in the improvement of creative thinking skills because students create the framework by themselves. However, in group B, ChatGPT created an answer for the problem with students' exact prompt. Therefore, students raised the confusion about the agency of thinking.

- *"It (ChatGPT) completely deprived my right to think during our preparation just now. Therefore, when it was our turn to perform, we went off script not knowing what to say."* (Steve)

- *"If the preparation time is extended to 20 minutes or more, we can understand the structure of ChatGPT and perform better. But we just passively accept it as an answer without actively thinking about it."* (Greenwood)

The interviews show that students were aware of they might lose their agency in the thinking process. In the process of problem solving, ChatGPT became the agency of thinking. Their higher order thinking skills is not practiced without independent thinking. This is alignment with literature of Putra et al. (2023) which suggested that higher order thinking skills declined in students who overused the ChatGPT [14].

6 Conclusions

The contribution of this study is mainly two folded: (1) It highlights students' limitations in generating effective prompts to enable ChatGPT to support themselves; (2) It also indicates that students consider the incorporation of ChatGPT might limit their own higher order thinking.

Previous literature suggested that ChatGPT can be used as a tool of learning and assessment since students could have positive experience in using ChatGPT due to its effectiveness and convenience (Lo, 2023) [1]. However, in this study, the participants from Group A were somewhat disappointed in their interaction with ChatGPT. They expressed difficulty in formulating prompts effectively to elicit the desired responses. Literatures believe the engineering of learning prompt can enhance the use of generative AI to a great extent (Giray, 2023; Mungoli, 2023) [15-16]. However, specific practice on this topic is still scarce. To solve the problem, university teachers can incorporate the element of generative AI into their course for improving education.

This study also delves into the negative impact ChatGPT might have on people's exercising higher order thinking skills. By conducting experiments and interviews, this study found that ChatGPT negatively influences the cultivation of higher order thinking skills by depriving students of the agency to think. This highlights the constrains of ChatGPT in supporting students' learning, despite of its numerous merits. To solve this problem, scholar has proposed that students should reflect on and modify the results generated by ChatGPT according to their own thinking skills (Yu, 2023) [17]. However, the effectiveness of this approach remains to be further investigated.

In conclusion, the present investigation underscores the necessity of further empirical inquiries aimed at elucidating methodologies for optimizing students' engagement with ChatGPT in an academically sound manner. Such endeavors should be designed to ensure that the utilization of this advanced language model enhances rather than supplants the critical cognitive processes underpinning student learning.

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