ChatGPT in Higher Education: Design Teaching Model Involving ChatGPT

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Abstract: There are two different views on the application of ChatGPT since its birth in higher education in academia: some suggest ChatGPT should be used by faculty and students to promote digital reform, and some believe that all applications of ChatGPT should be strictly regulated. With the widespread adoption of ChatGPT in universities, many researchers have found that it can improve learning performance and form personalised learning. However, the rising problems of academic integrity and misadvise should also be considered. Therefore, this study uses the literature review method to analyse the latest documents on the application of ChatGPT in higher education about its advantages, disadvantages and impact in educational fields. Moreover, it focuses on making a teaching model that aims to use ChatGPT effectively and efficiently, assisting the classroom. To construct this teaching model reasonably, the study divides it which, assisted by ChatGPT, into three parts: the teaching process, the multi-subject relationship and the multi-dimension evaluation, and tries to integrate CHatGPT into traditional classroom teaching. Based on the teaching design, some suggestions for using ChatGPT in higher education are made for future research: in the teaching process, ChatGPT can be viewed as a supplementary to traditional class; compared with the binary student-teacher relationship, the multi-subject relationship between student, teacher and ChatGPT can provide more emotional and interactive support; the participation of ChatGPT can increase make teaching evaluation more diverse. The study shows a positive attitude about using ChatGPT in higher education.

Keywords: ChatGPT, teaching model design, higher education

1. Introduction

In the educational field, ChatGPT, an artificial intelligence chat machine, has received widespread attention since it was launched by the OpenAI laboratory in the United States in November 2022. ChatGPT allows students and teachers to easily access information through various platforms such as websites or smartphone applications, and it is a more efficient tool to summarise information than traditional search engines [1]. Kamil Malinka and his colleagues attempted to evaluate the

impact of applying ChatGPT on university education by using ChatGPT as a subject test for learners in university courses [2].

Now, there are mainly two different attitudes towards the application of ChatGPT. ChatGPT poses a considerable threat to the cultivation of academic ethics and creativity. For instance, it may provide wrong information, reduce learning input, alienate the relationship between teachers and students, threaten academic ethics and cause information security problems [2]. Nevertheless, many scholars believe that ChatGPT has many positive effects on teaching and learning, such as reducing teachers' workload, promoting student-centred learning mode and cultivating the higher-order thinking ability of students. Some literature points out that digital transformation in higher education has become an inevitable tendency [3]. In the classrooms of colleges and universities, digital technology is used to promote the development of teachers' teaching ability and the innovation of teaching methods based on the digital environment [4]. From teacher-centred to student-centred, emphasising students' autonomy and participation in teaching and implementing digital transformation are essential directions for higher education reform. ChatGPT has excellent advantages in teaching innovation in higher education and can be used to assist teaching and facilitate students and teachers because of some limitations of traditional education mode. Nevertheless, educators must carefully choose the appropriate strategy and methods to design teaching models.

The referable papers for the teaching model design with ChatGPT participation are limited. This study focuses on the teaching model design in offline classrooms in higher education assisted by ChatGPT. Committed to reducing cognitive load, implementing deep learning, and improving learning performance. Based on the traditional teaching design model, this study will examine the practical impact of artificial intelligence on teachers, students and classrooms and offer some reasonable suggestions.

2. Application of ChatGPT in Higher Education

2.1. Application of Artificial Intelligence in Instructional Design in Higher Education

In recent years, with the continuous advancement of education reform, traditional teaching model design can no longer meet the needs of schools. The application of artificial intelligence in teaching design is particularly important for higher education. Artificial intelligence and wisdom have existed for some time. For instance, Gmail is an excellent example that it can be through the group online discussion of a particular teaching link, the group work together to complete the teaching design. Through the continuous development of AI, a new software, ChatGPT, was gradually used in teaching design, like writing essays and solving assignments through the platform. It can also help instructors create lesson plans and course outlines and reply to student evaluations. The way that instruction is designed has undergone some substantial alterations as a result of the use of artificial intelligence technology.

The participation of AI directly affects the teaching objectives and thus impacts the teaching design [5]. The traditional teaching goal is to get students a good job after graduation. However, with the development of science and technology, the training needs of talents have changed, and the teaching objectives have also changed. The current educational target is to cultivate talents with innovative thinking and practical ability.

The participation of AI has an indirect impact on teaching evaluation, and so does an influence on teaching design [5]. The traditional education, students' teaching evaluation is often based on the results given in the final examination. The development of artificial intelligence technology makes the evaluation of students in the education process more comprehensive and diversified. In this way, the evaluation of students has become more two-way and multi-directional.

2.2. Application of ChatGPT in Students' Personalised Learning in Higher Education

The integration of ChatGPT into personalised higher education learning involves multifaceted interaction. Personalised learning aims to expand students' knowledge, skills, and perspectives to align with their individual needs and goals [6]. Here, ChatGPT's role lies in delivering tailored academic learning, recommendations, and instructions to each student. Its access to a vast database empowers it to evaluate assignments, rectify errors, and offer feedback that precisely addresses specific mistakes. Notably, support of ChatGPT is available without temporal or spatial restrictions, distinguishing it from traditional education settings.

Furthermore, ChatGPT's capabilities include analysing students' past performances, writing styles, and preferences across prior courses. This intricate understanding equips it to discern students' strengths and challenges. Accordingly [7], explores how ChatGPT can establish personalised learning objectives and curriculum outlines for individual students. Following these outlines, ChatGPT can provide learning materials such as books and journals tailored to the complexity of the curriculum and the student's learning preferences, which ChatGPT has analysed. This approach aligns with adaptive learning, wherein technology automatically adjusts content and difficulty based on a student's performance [8]. Consequently, students engage with materials suggested by ChatGPT, and if difficulties arise, it can adapt its proficiency level and offer alternative resources. This interplay between ChatGPT and students gains depth through continuous feedback loops.

The impact of personalised learning on student motivation is notable [8]. Emphasises that customising learning resources according to students' interests enhances their enthusiasm for education, fostering higher engagement. ChatGPT's ongoing assessment of student outputs ensures a steady supply of tailored materials, enhancing satisfaction and motivation as the dialogue continues. This symbiotic connection between ChatGPT and students enriches learning and maintains momentum.

In these aspects, ChatGPT effectively assists teachers' goals by providing suitable learning materials and enhancing student engagement. This comprehensive integration demonstrates ChatGPT's capacity to advance personalised education.

2.3. The Advantages and Challenges of ChatGPT in Higher Education

As a highly advanced generative language model, ChatGPT is a transformative tool in the digitisation of higher education. Some academics and surveys have detected that ChatGPT was widely used and convinced by students [9,10]. It is hard to stop its step into campus and academia. Therefore, many researchers have focused on its adoption and potential implications in educational fields. Moreover, they found some commonalities in ChatGPT's performance, which included advantages and disadvantages.

The study analysed the content of the selected pieces of literature. It summarised them from six different perspectives: ChatGPT's strengths, weaknesses, positive and negative impact on education, and the researcher's attitude and suggestions.

Most of the literature recognises ChatGPT's usefulness in generating meaningful and tailored text in responding to a given prompt and providing real-time feedback. Furthermore, with the interactions that customise the requirements and refine the details, the correctness and relevance of the generated content will increase. ChatGPT is also versatile, it can meet the various demands of educators, such as curriculum syllabi for given topics, exam questions with different forms and emotional evaluation. Nevertheless, ChatGPT is also recognised as still in development: it may contain erroneous or inappropriate responses. None of the studies prove that the success rate of ChatGPT can reach 100%. Some researchers worry about the risk of biases and discrimination

ChatGPT might bring. Moreover, as a language model but not an expert system with limited contextual input, ChatGPT lacks expertise and may reply with wrong or inaccurate answers, which still need teachers to monitor and check.

On the positive side of implications in education, ChatGPT can enhance student learning, reduce teacher workload and offer communication support. According to students' individual competency and proficiency, ChatGPT can assist in facilitating personalised learning and assessment, making learning and teaching more effective and efficient.

In higher education, this sparked the particular concern of educators and universities about integrity and authenticity in academic research and study tests. From the student perspective, those who depend on ChatGPT also need more high-order skills and critical thinking skills.

As aforementioned content, the study views ChatGPT as a complementary intelligence instrument of traditional classroom instructional design, which can aim to assist teachers, rather than a substitute for them.

3. Teaching Model Design Involving ChatGPT in Higher Education

3.1. The Application of ChatGPT in the Teaching Process

The study divides the teaching process into three stages: before, during, and after class. Moreover, teaching activities are assigned according to the tasks and targets of each stage and the characteristics and advantages of ChatGPT.

In the traditional offline lecture class, teachers pay the most attention to the teaching during class to impart knowledge, spend less time on teaching interactions and answer questions immediately. Therefore, it is challenging to grasp each student's competency and status. Furthermore, some students tend to be ashamed to show their doubts, both of which make personalised learning challenging to implement.

However, ChatGPT can decrease teaching workload by completing pre-analysis and instructional content design, which makes personalised teaching possible and removes teachers from repetitive and cumbersome work to some creative and critical work. Teachers can discuss with ChatGPT and obtain large amounts of non-repetitive content and programs with emotions and detail requirements in seconds. During class, ChatGPT can be perceived as a teaching assistant. It can also provide different forms of texting and utterly various evaluations based on student responses.

Reduce the time students spend retrieving information and teach them to foster high-order thinking skills. ChatGPT can provide real-time feedback for students, which can strengthen their immediate memories and impressions. They can make requests to ChatGPT for personalised exercises and quizzes. Students can also ask ChatGPT for emotional support during the interaction, such as positive evaluation and encouragement.

As Figure 1 shows, according to the advantages of ChatGPT, different tasks are assigned at different stages to students, teachers and ChatGPT in the teaching process.
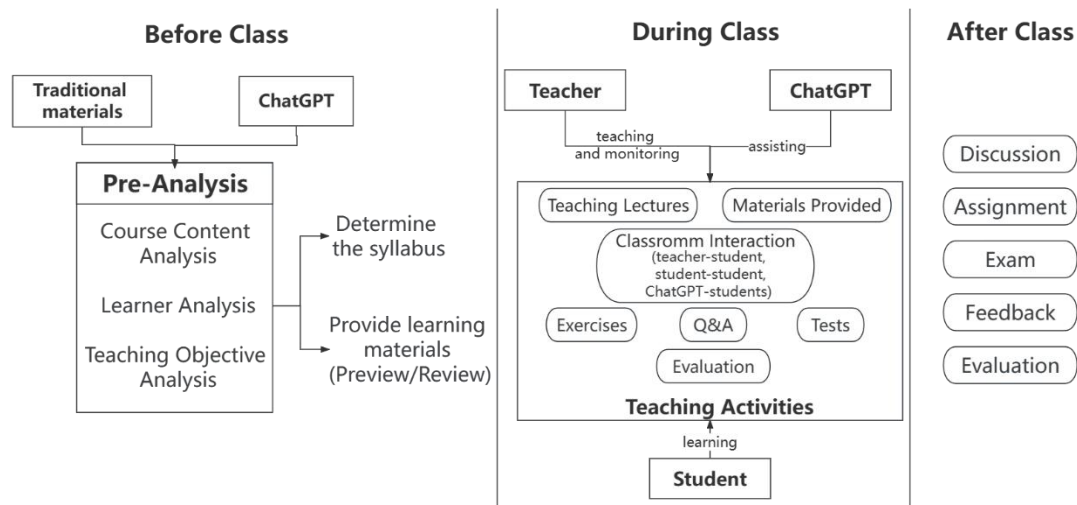
Figure 1: The process of teaching model with ChatGPT.

3.2. The Changes ChatGPT Brought to Teaching Relationships

In the traditional teaching relationship, the teacher is usually the leader, and the students are the receivers of knowledge. In teacher-fronted lessons, the teacher has a central role, ensuring that all the students receive the same information, but it cannot provide a motivating learning environment. In this kind of class, the questions and answers are repeated, and the students are entirely passive. Therefore, ChatGPT is used to supplement the traditional student-teacher relationship.

In the multi-subject student-teacher-ChatGPT relationship, the teacher is the learning leader, and the ChatGPT is the important supplementary of the learning.

ChatGPT can be convenient for teachers by reducing their workload, so that they can concentrate on their works at a higher level, thereby increasing student satisfaction with the work of teachers [11]. Teachers can obtain data on students' learning progress from the AI application, and provide further academic guidance for students based on the feedback given by the AI. Besides, ChatGPT can provide convenient access to information by providing a written response across a range of platforms' sources(such as a website or mobile app). It can be viewed as a much more effective tool than standard search engines, which can personalise unique emotional tendencies such as critical, positive and encouraging. Therefore, combining ChatGPT with other auxiliary devices in the classroom can lead to more efficient learning. As for students, ChatGPT can provide iimmediate feedbackon students' questions and needs. ChatGPT offers the potential to give students individualised support and feedback at various degrees of complexity. Figure 2 presents a new relationship between student, teacher and ChatGPT and introduces the mutual supply and demand.
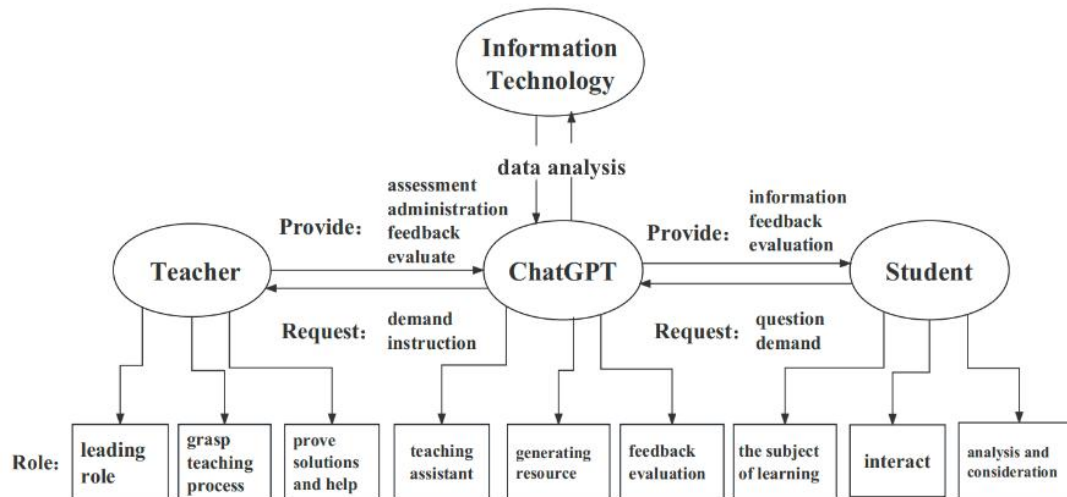
Figure 2: The multi-subject relationship between student, teacher and ChatGPT.

In education, ChatGPT presents a variety of options to improve individualised instruction and alter the role of instructors. In the new teaching relationship, students, teachers and ChatGPT are mutually promoting and inseparable.

3.3. The Application of ChatGPT in Classroom Evaluation

The development of a teaching evaluation system involves a series of essential steps. The initial phase should centre on defining the scope of the evaluation, a question that thoroughly addresses [12]. Despite its origin dating back to the previous century, the framework retains its relevance in contemporary times [12]. This framework is inclusive, encompassing all facets of the educational landscape, which this paragraph will expound upon. The assessment of teaching effectiveness must consider four key dimensions: pedagogical, technical, cultural, and organisational domains. While this essay will primarily delve into the first three domains, it is essential to note the interconnectedness of all four.

The pedagogical domain covers disciplinary and interdisciplinary aspects of education, including teaching methodologies, learning techniques, and assessment practices. It spans both educators and students, the pivotal participants in the educational ecosystem. Assessment methods span a wide range of activities such as homework, quizzes, exams (evaluating both short-term and long-term outcomes), student interviews, and the creation of student profiles to facilitate personalised assistance. Notably, a blending of online and offline resources can enhance the quality of support [12]. This fusion underscores the symbiotic relationship between the pedagogical and technological domains.

The technological domain concerns the accessibility of information technology and the support it offers users, namely teachers and students. The evaluation of virtual learning environments is guided by stakeholders' criteria, centring on their capacity to fulfil learning objectives. Comparisons between student performances in offline and blended learning settings and stakeholder interviews are evaluative methods [12]. It also emphasises the need to assess not only how technology aids learning but also its practical implementation. For instance, potential obstacles, such as existing education policies, can hinder utilising services like ChatGPT. This technological domain intertwines with the cultural domain, exemplifying the intricate connections within the system.

The cultural domain addresses linguistic nuances, student personalities, and the creation of classroom communities that foster emotional engagement. It encompasses objectives of education that extend beyond the formal curriculum, encompassing aspects such as socialisation, identity development, and emotional growth within societies [13]. Highlights the significance of assessing students' facial expressions and body language as an evaluative metric. Figure 3 presents an array of alternative evaluation methods within the education system.
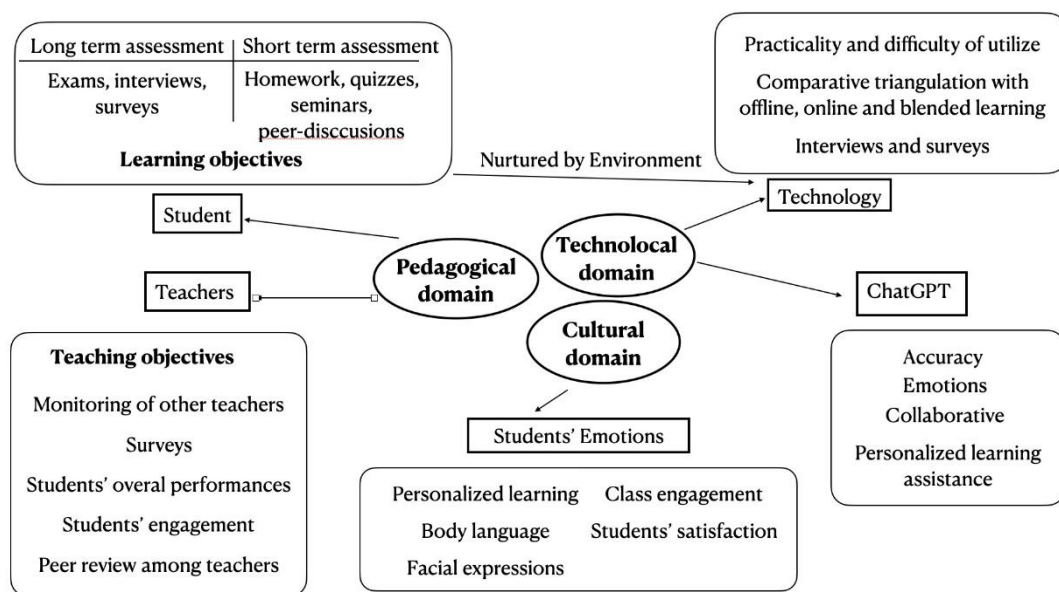

Figure 3: Means of classroom evaluation modified based on frances deepwell's model with additional examples [12].

Ultimately, evaluations yield valuable insights that inform reviews of current strategies, identify potential enhancements, expedite decision-making, and encourage educators to reevaluate teaching objectives. As mentioned earlier, an essential aspect of such evaluations involves the nuanced profiling of students, enhancing individuality and personalised learning experiences.

4. Suggestions for Using ChatGPT in Higher Education.

4.1. ChatGPT as a Supplement in Classrooms

The participation of ChatGPT aims to improve the teaching and learning process in the traditional instructional design. As a supplement, ChatGPT can effectively make up for the places teachers cannot scruple in teaching, such as checking the correctness of spelling and answers, evaluating the process and guiding learning according to student's individual learning conditions [14,15]. These make it possible to implement personalised learning in the offline classroom, whose primary teaching method is teacher-led lectures.

Although teachers should adequately consider the availability of ChaGPT and utilise it to help teach and reduce the burden, they must make sure that all interactions with chatGPT are under their supervision of themselves all the time. In addition, if ChatGPT is used in education, no matter what tasks or teaching activities it undertakes, the users must evaluate the process and results to ensure they stay within the teaching purpose and actually learn something from it [10].

Regarding interaction and learning motivation, teachers should provide adequate teacher attention and communication, ensure students express positive emotions in the classroom, and use

ChatGPT. Teachers and educators should give students more critical and deep-thinking tasks to avoid academic misconduct instead of repetitive and straightforward assignments. In the teaching process, the educators must grasp the dominant position of teachers, teachers should control teaching from the whole.

4.2. Multi-subject Relationship Between Student, Teacher and ChatGPT

Although there are many advantages to applying ChatGPT to higher education, this conversion brings about challenges in information sources, risk awareness and moral integrity. Here are some suggestions for addressing the mentioned issues above and creating plans to ensure ethical and equitable implementation, which are essential if AI in education is to achieve its full potential.

ChatGPT has brought up several moral concerns among students, including plagiarism and cheating, and its sources may be problematic. One study found that using ChatGPT to write a 500-word paper was up to 45 percent similar to network resources [16]. With the development of science and technology, education will be more dependent on artificial intelligence in the future, how to change the form of schoolwork and and how to cultivate students' creativity are essential [17]. There are concerns about privacy and data security when using ChatGPT and other generative AI models in education. It is crucial to remember that, although being an effective tool, ChatGPT and other AI must take the role of something other than human teachers and tutors. These tools should be appropriately used, along with guidance and assistance from people. In general, ChatGPT and other AI can facilitate education and teaching. But educators are also aware of their limitations and avoid relying too heavily on technology. The first issue teachers need to address is integrating AI technology into classroom instruction and guiding students to use it effectively, how to deal with the incorrect and nonsensical answers ChatGPT is prone to generating, etc.

4.3. Multi-dimension Evaluation in Classroom

As previously discussed, ChatGPT has demonstrated its utility across various facets of higher education classrooms and holds a significant role within the technology domain of higher education evaluation. This paragraph delves deeper into its impact on the evaluation process.

At an indirect level, an essential criterion for evaluation involves assessing the extent to which education accomplishes both teaching and learning objectives. ChatGPT exhibits the capability to assist in structuring course content. By analysing student profiles comprehensively, ChatGPT can formulate learning objectives that align with individual student capacities [18].

On a more direct level, ChatGPT is adept at devising assessments, encompassing both short-term and long-term evaluations, as previously discussed. This approach gauges the degree to which educational goals, devised with ChatGPT's assistance, are met. ChatGPT is proficient in designing students' assignments tailored to their profiles, and it can also generate unique tasks based on individual students' capabilities to promote personalised learning. The adaptability of ChatGPT empowers it to respond to diverse assessment formats, including writing-based and multiple-choice assessments, effectively addressing teachers' varied needs. Furthermore, teachers can fine-tune the assignments generated by ChatGPT to match their preferences precisely.

Additionally, ChatGPT can grade assignments and homework it generates for students, swiftly identifying areas of weakness, potential uncertainties, and concerns within a student's grasp of the curriculum [19]. Given ChatGPT's rapid response time, these evaluations can be conducted within seconds, significantly enhancing teaching efficiency. This lightens teachers' workload concerning assignment design and grading and capitalises on ChatGPT's ability to pinpoint student weaknesses and overall trends.

Returning to the graph referenced in the context of teaching evaluation in higher education, ChatGPT's contribution falls within the pedagogical domain. ChatGPT is instrumental in the generation of student assessments. Furthermore, in the role of the teacher within this domain, ChatGPT simplifies the evaluation of students' comprehensive performances, streamlining the data collection process.

5.   Conclusion

The study uses literature research to explore the advantages and disadvantages of ChatGPT and its utilisation in higher education. According to the status of ChatGPT research, the study is devoted to researching how to build a teaching model, form teaching activities and organise teaching relationships in the offline lecture-style classroom assisted by ChatGPT. This teaching model ignores the subject characteristics of specific subject classrooms. It aims to help students implement personalised learning, help teachers reduce workload, conduct multi-dimensional evaluations, and improve learning performance.

The study still has a long way to go in using artificial intelligence in teaching. In order to improve education and assist student learning, policymakers, researchers, educators and technology experts should collaborate and begin discussing how these growing generative AI tools may be utilised securely and constructively.

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