



Research and Exploration on the Integration of ChatGPT in High School Information Technology Assisted Personalized Teaching Taking "Enumeration Algorithm" as an Example

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Abstract. With the rapid development of artificial intelligence technology, integrating AI-powered tools in the field of education has become a promising research direction. This paper discusses the advantages of using ChatGPT in teaching high school information technology courses, including learning diagnosis, curriculum design, instructional content design, abundant teaching resources, classroom assistance, homework assessment, and personalized learning support. At the same time, it proposes the design of incorporating ChatGPT into the teaching model of high school information technology courses, including pre-class, in-class, post-class, and data collection and organization. Finally, taking "Enumerative Algorithms" as an example, it demonstrates how to integrate ChatGPT into specific course design.

Keywords: ChatGPT; high school information technology; teaching model design

1 Introduction

The application of ChatGPT in the field of education opens a new era of collaboration between artificial intelligence and human intelligence. This transformation can address issues in high school information technology classroom teaching, such as students focusing too much on basic tasks and neglecting the development of their thinking abilities, teachers overly predefining problem-solving paths and depriving students of opportunities for self-exploration, and teaching methods and evaluation criteria that fail to meet the needs of all students^[1]. By leveraging ChatGPT and other natural language processing models, personalized, adaptive, and interactive customized learning experiences can be achieved to meet students' learning abilities, problem-solving, and support needs. This application has the potential to change learning and teaching approaches, provide equitable educational support and guidance, and bring many advantages to the field of education^[2].

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2 Advantages of ChatGPT in the Teaching of Information Technology in High Schools

1. Diagnosis of academic conditions: Through ChatGPT, teachers can gain a better understanding of students' learning needs and current status, enabling them to provide data-driven support for selecting appropriate teaching strategies [3].

2. Course design: By instructing ChatGPT, teachers can generate tailored syllabi for specific knowledge points, facilitating the creation of customized courses to enhance teaching efficiency and improve learning outcomes [4].

3. Teaching content design: ChatGPT can assist in designing course introductions, explaining case studies, and creating exercise materials for specific knowledge points. This empowers teachers to develop more effective teaching content to enhance instructional effectiveness [5].

4. Concentrate on enriching lesson preparation resources: ChatGPT can quickly collect various materials to assist teachers in lesson preparation resource collection. In terms of student learning, ChatGPT can generate learning materials and assignments suitable for each student's learning style and subject area based on the student's learning history and interests, so as to improve learning effect and learning motivation [6].

5. Classroom teaching assistants: Class ChatGPT can provide a real-time sharing platform for teachers and students, establish a class QQ group, configure an artificial intelligence assistant as a teaching assistant in the class QQ group, answer questions in real time, provide ideas for classroom activities, increase classroom interest and enrichment, help students understand complex content and concepts, and become teachers' artificial intelligence teaching assistants, after-class tutors or debate sparring partners [7].

6. Job evaluation: ChatGPT can participate in student assessments, generate homework quizzes and exams, and help teachers evaluate students and observe learning progress. For example, in English class, teachers can give students the task of translating a certain passage, students can translate it themselves, and then send the translated sentence to ChatGPT to have it retouched, so that students can find the gap between their own translation and a beautiful translation, so as to reflect on themselves and close the gap [8].

7. Personalized assisted learning: (1) Opinion extraction: It can quickly generate learning materials, such as abstracts, flashes and quizzes, etc., to help students review and study course materials. In addition, students can ask ChatGPT to read a chapter in the textbook to produce an easy-to-understand summary to better understand the course content. ChatGPT-like can also help students break down huge tasks into smaller, achievable parts, developing students' sense of autonomy and confidence to complete tasks. (2) Content translation: ChatGPT allows for the seamless translation of teaching content, making it more accessible and understandable for students. Students can also utilize ChatGPT to learn different languages, accessing language-specific resources such as glossaries, conversational exercises, and grammar lessons. This technique is particularly helpful for expanding students' vocabulary, as they can inquire about sentence formation using newly learned words. (3) Individualized guidance: ChatGPT can provide students with personalized explanations, assignment instructions, and

supplementary resources to enhance their problem-solving skills. This is especially beneficial for students who face difficulties in certain subjects or concepts and require additional support to improve their self-efficacy and motivation [9].

3 The Design of ChatGPT Integrated into the Teaching Model of High School Information Technology Courses

In the teaching of information technology in high schools, ChatGPT, as an AI assistant, can provide teachers and students with personalized teaching and learning plans, and assist teachers to complete teaching tasks and students to explore problems. Specifically, the following teaching model can be taken, as shown in Fig. 1.

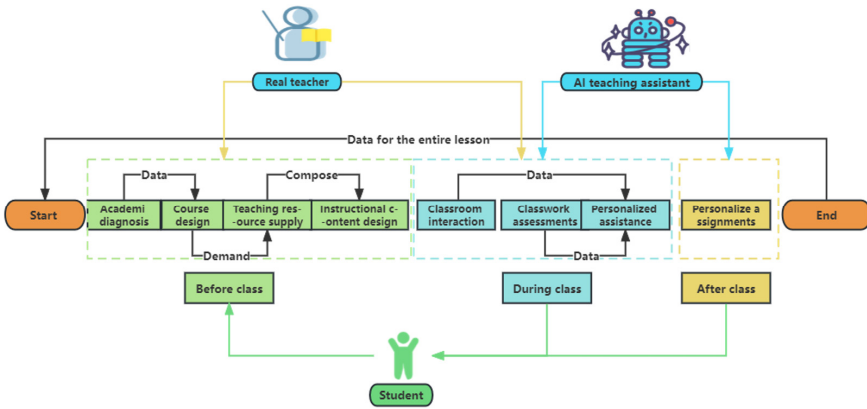


Fig. 1. Teaching model

1. Pre-class stage: Academic diagnosis and curriculum design. Teachers can use ChatGPT to generate academic questionnaires and test questions, conduct pre-tests and analyze students, and provide guidance for personalized teaching. At the same time, teachers can also use ChatGPT to quickly search for relevant teaching resources and design syllabuses to support the design of teaching content [10].

2. In-class Stage: Classroom interaction and personalized assistance. Teachers can use ChatGPT to generate classroom tests and tasks for students to discuss and collaborate in class, and use ChatGPT as a group assistant to provide question answering and inspiration. At the same time, teachers can also use ChatGPT for personalized assistance to help students better understand and master knowledge points [10].

3. Post-class stage: After-class exercises and problem exploration. Teachers can use ChatGPT to generate developmental after-class exercises, so that students can strengthen and master knowledge points after class. At the same time, students can use ChatGPT to explore and solve problems and deepen their understanding of knowledge points.

4. Data collection and organization: Organize students' questionnaire and test data, class discussion and task data into electronic portfolios to provide decision support and personalized recommendations for subsequent teachers' teaching and students' learning.

4 ChatGPT is Integrated into the Design of the "Enumeration Algorithm" Course

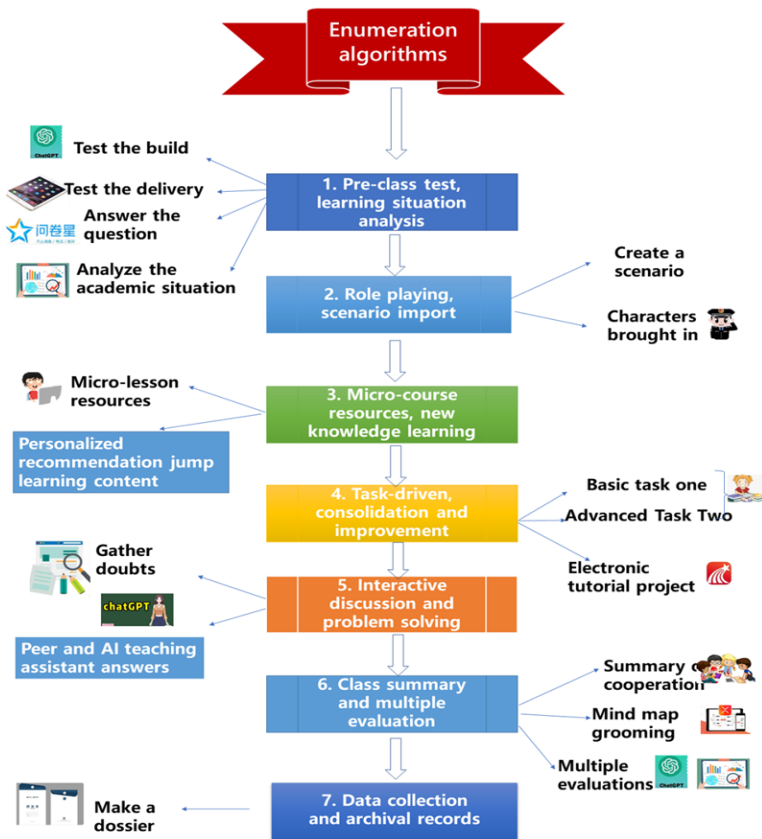


Fig. 2. Case flowchart

1. Pre-class test, learning situation analysis: Teachers use ChatGPT to generate teaching questionnaires according to the characteristics of high school students and the characteristics of the information technology course "Enumeration Algorithm", and send questionnaire word clouds through questionnaire stars to show the basic needs and conditions of students.

2. Role playing, scenario import: Create a storyline of police detection of counterfeit banknote cases, students play the role of police assistants to help police solve cases into the classroom, and gradually construct the knowledge of enumeration algorithms in the process of solving cases.

3. Micro-course resources, new knowledge learning: Students watch micro-lesson resources to learn the knowledge points of class content.

4. Task-driven, consolidated and improved: Teachers issue learning tasks around classroom scenarios and new lesson knowledge in the learning pass, and students complete the corresponding tasks and upload the learning pass.

5. Interactive discussion and problem solving: Students have classroom discussions in QQ groups with ChatGPT (AI Teaching Assistants) to solve problems encountered in completing tasks, which can be answered by peers or group assistants.

6. Classroom summary and multiple evaluations: The class review summary is carried out by recall, and the corresponding questionnaire is generated according to the student's current situation through ChatGPT, and the student completes the self-learning evaluation of the lesson through the questionnaire. Teachers evaluate students in multiple ways according to their completion of tasks.

7. Data collection, archival records: Organize the data of student questionnaire stars and learning pass data to form students' personalized electronic portfolios.

The case flow chart is shown in Fig. 2.

5 Conclusions

ChatGPT, as an AI assistive technology, can indeed provide students and teachers with more personalized and flexible learning and teaching methods, thus promoting innovation and progress in education and teaching. At the teaching level, ChatGPT can assist teachers in quickly searching for lesson preparation resources, generating instructional designs, and preparing teaching courseware. This assistance greatly improves the efficiency and quality of teacher lesson preparation, helping them better prepare teaching content and making teaching more creative and targeted.

The emergence of ChatGPT has brought convenience and innovation to the education field, providing better learning and teaching experiences for students and teachers. It makes student learning and teacher teaching more personalized and flexible, giving birth to new forms of education and teaching. However, it is important to recognize that although ChatGPT can provide feedback and assistance, it is still a model trained on a large amount of data, and may have certain limitations and biases.

Therefore, when using ChatGPT for learning, students should maintain critical thinking, consider the suggestions provided, and communicate and discuss with teachers and other learning resources to ensure the accuracy and quality of learning. For teachers, ChatGPT can help conveniently search for resources, generate instructional designs, prepare courseware, and generate appropriate multimedia materials. Teachers can describe their needs to ChatGPT and make modifications based on the generated results, saving time and improving the quality of lesson preparation.

However, it is important for teachers to use ChatGPT in a rational manner and not overly rely on it, while still considering their own professional knowledge and experience. ChatGPT is just a tool, and teachers should use their teaching philosophy and judgment, comprehensively considering students' needs and educational goals, in order to effectively carry out lesson preparation work.

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