

# ChatGPT - A new milestone in the field of education

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**Abstract.** With the rapid development of artificial intelligence, natural language processing models like ChatGPT hold creative potential for applications in education. This study focuses on ChatGPT and explores its applications in the field of education. This research employs literature review and case analysis methods to systematically investigate the applications of ChatGPT in instructional assistance, personalized education, and writing support. By analyzing three cases involving ChatGPT's professional competence in medical exams, the construction of personalized learning systems, and writing support, the paper emphasizes ChatGPT's advantages in education, future development directions, as well as ethical and privacy concerns. The study finds that ChatGPT possesses strong semantic understanding and analytical capabilities. Within the context of general applicability, it can provide accurate answers to questions posed by users with certain specialized backgrounds. The paper not only addresses ChatGPT's role as a student's auxiliary tool but also explores collaborative models between ChatGPT and teachers. However, it's important to note that ChatGPT currently has limitations in terms of limited knowledge and inadequate emotional understanding. Additionally, in terms of ethics and privacy, considerations regarding information protection and moral aspects within the educational application of ChatGPT are crucial. In the future, it's worth further exploring specialized models for ChatGPT's tasks in both teacher and student roles, along with enhancing ChatGPT's emotional support capabilities.

**Keywords:** ChatGPT, education, instructional assistance.

## 1. Introduction

In recent times, the domain of education has witnessed significant transformations and advancements, influenced by technological advancements, social demands, and the trend of globalization. With the integration of the education field and new technologies, technological tools such as smartphones, tablets, and online learning platforms have provided students and teachers with more learning and teaching resources [1].

While having abundant learning resources, more attention should be paid to the fact that education for different students should not be one-size-fits-all, but rather personalized. Students nowadays also require more interactive learning experiences rather than solely relying on one-way teaching from teachers. Artificial Intelligence (AI) technology combined with the education field has become a possible solution. As one of the landmark achievements in the current development of artificial intelligence technology, Full name (ChatGPT) has made groundbreaking progress in conversation and

language communication, demonstrating tremendous potential for applications in the field of education.

Since the Industrial Revolution, various machines created by humans have greatly increased social productivity. At the same time, humans have also desired to create intelligent machines or tools to meet various application needs and exploratory desires in different fields. In the past 65 years, research and development in the field of artificial intelligence have made significant progress in both theory and application [1]. The Turing test, as a renowned benchmark for AI development, has long been widely regarded as a crucial criterion to determine whether AI possesses intelligence[2].With the continuous development of large language models, passing the Turing test no longer seems to be a challenging problem. ChatGPT is a natural language processing technology developed by OpenAI. It is a versatile language model that can be applied in various domains, including chatbots, automated replies, content generation, and more. ChatGPT's core is the pre-training phase, where it utilizes vast amounts of unsupervised textual data for training. During this phase, the model observes extensive language data and learns rich language knowledge and patterns. Pre-training equips ChatGPT with broad language understanding capabilities, enabling it to recognize context, reason logically, and generate natural and fluent text.

As a gem in the field of artificial intelligence, ChatGPT holds profound significance in the education sector. Tapalova et al. dedicated to researching the application of ChatGPT in personalized education systems [3]. Kumar et al. apply artificial intelligence to score titles to improve students' writing strategies [4]. Obviously, ChatGPT can provide customized teaching content and answer questions based on students' needs and learning progress, making the learning process more personalized [5]. Simultaneously, it can act as an intelligent tutoring assistant in the education field, serving as a 'virtual teacher' with real-time interaction outside the classroom, creating a second classroom [6].

The other parts of this article will be described as follows. In the second section, the paper will present some examples of ChatGPT applications in the field of education. In section 3, this review will present various possibilities of applying ChatGPT in the field of education. Finally, in section 4, the author will provide a conclusion.

## 2. Method

### 2.1. ChatGPT

As the most well-known artificial intelligence, ChatGPT has achieved significant accomplishments across a wide range of application areas. Developed by OpenAI, it has the latest version which is GPT-4. Compared to the previous GPT-3.5 version, GPT-4 is a more advanced multimodal model capable of accepting both image and text inputs [7]. ChatGPT excels in natural language processing, demonstrating the ability to understand and generate human language, including tasks like text-based question answering, conversation, summarization, and creative writing [8].

### 2.2. ChatGPT-based educational method

*2.2.1. The performance of ChatGPT on medical licensing exams.* Gilson et al. evaluated ChatGPT's performance in the scope of the US medical licensing exams Step 1 and Step 2. They tested ChatGPT's performance using multiple-choice questions based on two sets of exam scopes. One set of questions was sourced from AMBOSS, a commonly used medical student question bank, and the other set was sourced from the National Board of Medical Examiners (NBME)'s free question bank. Additionally, Gilson et al. evaluated ChatGPT's performance in the scope of the US medical licensing exams Step 1 and Step 2. They tested ChatGPT's performance using multiple-choice questions based on two sets of exam scopes. One set of questions was sourced from AMBOSS, a commonly used medical student question bank, and the other set was sourced from the National Board of Medical Examiners (NBME)'s free question bank. Additionally, Gilson et al. evaluated using three metrics: logical

reasoning of the selected answers, the presence of information within the question, and the presence of information outside the question [9].

Through the testing, Gilson et al found that ChatGPT's performance in the medical field is comparable to that of a third-year medical student. Due to the format of the test where descriptions of questions were presented in the form of complete dialogues, they highly praised ChatGPT for its ability to provide information and analysis [10].

Gilson's et al. research results undoubtedly demonstrate the potential of ChatGPT in the field of medical education. For instance, it can serve as an auxiliary assistant for students studying medicine, providing theoretical knowledge and reference information on certain questions, and engaging in real-time discussions and analysis with students. Considering the specialized and complex nature of the medical field, ChatGPT helps improve students' learning efficiency and logically reason through typical cases.

Every decision made by a doctor in their work has a significant impact on the well-being of their patients. Therefore, in the education and training of medical students, the involvement of ChatGPT should undergo professional evaluation. This is to prevent any potential errors that ChatGPT might make, which could lead students to develop incorrect understandings of certain issues. Such errors could have serious consequences for a patient's life and health.

*2.2.2. The exploration for ChatGPT on personalized learning pathways.* Tapalova et al dedicated to the exploration of AI in personalized learning systems. They proposed a framework that includes technologies such as social networking, educational expert systems, intelligent mentors, and virtual educational environments. Through analyzing specific case studies of AI implementation in education (conducting course experiments using AI technology with 184 second-year university students), they identified the main advantages of personalized learning pathways. Based on their findings, they presented a corresponding education paradigm [11]. Tapalova et al indicates that personalized learning is a diversified system that encompasses various technological applications, rather than just referring to AI serving as an educational mentor to guide students.

Educators should fully consider the personalized needs of learners when building personalized education plans. This approach will enhance their engagement and interest in learning, ultimately accelerating the learning process and stimulating their independent thinking about the study content [11].

While applying artificial intelligence to personalized learning systems, the paper must also consider the social, ethical, and moral issues associated with AI technology. Artificial intelligence is often at the heart of controversies related to the automation of public services, such as disregarding user data privacy or manifesting biases and discrimination in algorithmic forms [12].

*2.2.3. The writer for academic papers.* In order to test the capability of ChatGPT, Zhai conducted a significant pilot experiment [13]. The author asked ChatGPT to write a paper on the topic of artificial intelligence and engaged in a series of conversations to refine the details and content of the paper. The results showed that ChatGPT was able to assist researchers in writing a coherent, partially accurate, and informative paper. Moreover, this writing process only took 2-3 hours [13]. In the experiment, Zhai used different ways of asking about certain topics, yet ChatGPT consistently understood the meanings of the topics being asked and provided the same results. This demonstrates that ChatGPT possesses strong semantic understanding and information processing capabilities, enabling it to adapt to various expressions and deliver consistent responses. This is highly valuable when using ChatGPT for academic writing and learning tasks, as it ensures the accuracy and consistency of the results. Therefore, at the educational level, the future should focus on enhancing students' creativity and critical thinking abilities, rather than merely emphasizing general skills [13].

### 3. Applications and discussion

#### 3.1. *Teaching aid tool*

When it comes to the application of ChatGPT in the field of education, the general public tends to primarily consider the role of ChatGPT in students' learning. However, reverting to the essence of education, within a typical educational scenario, the teaching methods employed by educators have a profound impact on students' learning situations. Faced with multiple educational subjects, teachers find it challenging to provide suitable educational approaches for every student, and in certain situations, they may also struggle to meet students' learning needs such as addressing queries, clarifying doubts, and providing feedback on assignments. Therefore, in the future, ChatGPT may provide various forms of assistance to educators. From one perspective, ChatGPT can offer personalized teaching recommendations to teachers. Educators can engage with ChatGPT to explore the strategy of adapting different students' learning styles and levels, formulate appropriate teaching strategies, methods, and assessment approaches. From an alternative vantage point, ChatGPT can function as a classroom assistant, aiding teachers in monitoring students' learning progress and performance, providing real-time data and feedback.

#### 3.2. *Thesis writing assistant: ChatGPT*

When discussing education and considering another essential element, students, the general public holds high expectations for the application of ChatGPT in enhancing students' individual learning experiences. The current article maintains that ChatGPT possesses substantial potential for guiding students in completing academic papers. ChatGPT is capable of accurately comprehending content provided to it in textual form, and its latest version, 4.0, can even recognize images shared by users. During the process of academic paper composition, students often encounter challenges related to the standardization of writing format and language usage. Difficulties may arise in areas such as vocabulary, grammar, and the overall structure of the paper [14]. In this aspect, ChatGPT can assist students in formulating a clear structure for papers based on different topics, including arranging sections like introduction, main body, discussion, and conclusion to ensure logical coherence. Simultaneously, ChatGPT can optimize certain aspects of language within the text; for example, it can enhance rhetoric or adjust the logical sequence of expressions to make sentences more expressive, logical, and fluent. Additionally, ChatGPT can aid students to check for grammar errors, spelling mistakes, and proper punctuation usage in their papers. However, it should acknowledge that while ChatGPT can offer assistance, students still need to maintain independent thinking and creativity, avoiding complete reliance on content generated by the model.

#### 3.3. *Personalized learning assistant: ChatGPT*

When discussing the important potential applications of ChatGPT in student learning, personalized learning is undoubtedly the most prominent area. This article contends that learning in different academic disciplines shares certain commonalities. To be more specific, for instance, when studying medicine, students need to practice using question banks, while law students similarly require specific cases for analysis in their legal studies. Therefore, the role of ChatGPT should not be confined to a specific subject; rather, its universal value should be greatly leveraged. In the realm of personalized learning, ChatGPT can customize the learning experience, provide real-time question answering, offer personalized feedback on student learning, and provide emotional support and motivation, among other applications.

### 4. Conclusion

In this paper, the author reviewed the recent developments in artificial intelligence in recent years. With ChatGPT as the primary research focus, this study investigated the potential applications of ChatGPT in the field of education, exploring its prospects and possibilities. The author, using examples from medical exam preparation, personalized learning systems, and academic paper writing,

discussed various application methods and prospects of ChatGPT within these domains. Drawing insights from these discussions, the author proposed potential future directions for the application of ChatGPT in the field of education. The educational landscape was divided into two major aspects: educators (teachers) and learners (students), and subsequently explored specific application scenarios of ChatGPT in both realm. The author discussed the application of ChatGPT in the educational contexts of teachers and students, presenting concrete strategies for each. Especially within the domain of personalized learning, the authors emphasized the importance of fully harnessing the universality of ChatGPT. Although this paper has described the current capabilities of ChatGPT through specific examples, it's important to note that the technology of ChatGPT is continually evolving, and its abilities are constantly improving. As time progresses, it can be reasonably anticipated that ChatGPT's applications in the field of education will present even more exciting possibilities.

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