



Research on Educational Change Based on ChatGPT Background

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Abstract. ChatGPT, as a chatbot, is trained by reinforcement learning based on human feedback using AIGC technology. ChatGPT not only enables instant conversation, but also performs advanced tasks such as text content generation, computer code generation, and quickly translating text. As a large language model based on deep learning framework, ChatGPT will bring the following changes to the education industry: human-computer collaboration will replace class teaching and become the mainstream teaching mode; Promote the function of teachers from teaching to educating; Paperless campus becomes possible; Effective learning will be replaced by meaningful learning. ChatGPT is a "double-edged sword" for the education industry. In the face of the strong attack of ChatGPT, the education industry should treat it rationally and effectively achieve "education for the people".

Keywords: ChatGPT, artificial intelligence, educational reform

1 INTRODUCTION

The rapid development of artificial intelligence technology has brought profound changes to all walks of life. Artificial intelligence technology is widely used in the education industry with the functions of computer vision, pattern recognition, deep learning, knowledge graph, and natural language processing. In November 2022, ChatGPT was born. As a new generation of conversational natural language recognition model relying on artificial intelligence technology, it has attracted close attention worldwide. Compared with AlphaGo, ChatGPT's encyclopedia-like functions and ability to answer various questions accurately and deeply demonstrate the power of artificial intelligence, which has a profound impact on the reform of education. By analyzing the characteristics of ChatGPT technology, this paper discusses the application of ChatGPT and its underlying artificial intelligence technology in the education industry, analyzes the profound changes brought by ChatGPT to the education industry, and gives practical reference suggestions for the challenges brought by ChatGPT in the education industry.

2 TECHNICAL FEATURES OF CHATGPT

ChatGPT is a conversational artificial intelligence model. It is based on deep learning of a large number of existing text and dialogue data. For this reason, ChatGPT is often seen as a chatbot powered by artificial intelligence. Generative Artificial Intelligence, the core technology of ChatGPT, is essentially an extremely powerful sequential text prediction model. The power of this model is not only reflected in its excellent computing power, It is also reflected in the rich parameters accumulated after massive data training. In addition to the convenience of instant conversation, ChatGPT is capable of a range of advanced tasks such as text content generation, computer code generation, and quickly translating text.^[1]

2.1 Massive Model Parameters and Training Data

OpenAI released GPT-1 in June 2018, and since then, the number of model parameters and pre-training data has grown rapidly. In November 2022, OpenAI released GPT-3.5. The number of model parameters has reached 100 billion, and the amount of pre-training data has reached 100 TB. The number of parameters of the new generation GPT-4.0 model has exploded. Table 1 compares the number of GPT model parameters with the amount of pre training data.

Table 1. Comparison between the number of GPT model parameters and the amount of pre-training data.

GPT model	Release time	Number of parameters (in)	Amount of pre-training data
GPT-1	June 2018	117 million	5GB
GPT-2	February 2019	1.5 billion	40GB
GPT-3	May 2020	175 billion	45TB
GPT-3.5 (ChatGPT)	November 2022	Billions of billions	100 TB level
GPT-4.0 (ChatGPT)	March 2023	trillion-level	13 trillion tokens

2.2 Reinforcement Learning Based on Human Feedback was Used for Model Training

In this process, the human trainer plays the role of the user and the AI assistant. Thus, the output of the artificial intelligence model is highly consistent with the cognition, perspective, and value of the human world, which successfully solves a core problem faced by the generative AI model.

2.3 Introduction of Manually Labeled Data

GPT is the abbreviation of Generative Pre-training transformation model, which constructs a pre-trained language model by pre-training with a huge text corpus data. GPT then takes a small task-specific language dataset and fine-tunes it using transfer learning principles to build a model suitable for downstream tasks. This process ensures that GPT can flexibly adapt to different task requirements and generate high-quality output results. OpenAI is committed to improving ChatGPT's ability to understand human commands by dedicating a large number of professionals to manually annotate the data. [2] By doing this, ChatGPT is able to more accurately capture the nuances of human language, resulting in answer output that is more human and closer to human expression.

3 CHATGPT'S APPLICATION PROSPECTS IN THE EDUCATION INDUSTRY

3.1 Human-computer Collaboration will Become the Mainstream Teaching Mode

The embryonic form of the class teaching system was born in 1485. Relying on the papermaking and printing invented by our country's ancestors, the class teaching system made it possible that "a teacher could teach hundreds of students at the same time", which greatly improved the efficiency of education and promoted the popularization of education. However, it makes it very difficult to teach students in accordance with their aptitude. The following measures such as "course selection system", "credit system" and "grade point system" have failed to shake the mainstream status of class teaching system in school education. How to provide learning opportunities to anyone who wants to learn at any time and support individual teaching is a big problem in the field of education. The birth of ChatGPT makes it possible for intelligent robots to enter the classroom with the help of ChatGPT and its underlying AI technology. By observing students' emotional reactions in a variety of teaching scenarios, analyzing the correlation with academic achievement, adopting different teaching schemes, and taking the free and comprehensive development of personality and talents as the learning goal. "Human-computer collaboration" will eventually become the mainstream teaching form in schools in the future. [3]

3.2 Promote the Function of Teachers from Teaching to Educating

In the traditional concept of education, teachers are often regarded as "knowledge disseminators", responsible for imparting knowledge and wisdom to students. However, with the emergence of intelligent models such as ChatGPT, which have all the knowledge in the world to date, the positioning of the teacher's role is being completely overturned. What role can teachers play in addition to transferring knowledge has become a problem worth thinking about. ChatGPT can not only provide rich knowledge resources, but also intelligently tutor students according to their individual needs, which

makes the role of teachers change from a simple knowledge transmitter to a guide and partner in the learning process of students. A variety of values coexist in society, and ChatGPT is also impacting people's values. The essence of education is to transform natural people into social people. It is an important responsibility of educators to guide students to accept social mainstream values and behavior norms. ChatGPT will promote teachers' functions from teaching to educating people.^[4] In the teaching of human-computer collaboration, teachers need to be proficient in AI technology, be able to supervise and correct errors when the machine appears, such as model errors and judgment errors, and become the guardian of students' hearts.

3.3 Paperless Campus Becomes Possible

Textbooks are usually the basic tools for schools to carry out teaching work, but using paper textbooks to consume paper is not environmentally friendly, and the transmission of knowledge lags behind, which cannot meet the actual needs of each student. With the rise of artificial intelligence, we can build an intelligent robot that includes all the learning materials of students according to the network structure between knowledge and the results of positioning test. This robot can provide students with different degrees of basic knowledge, formulate matching private learning programs, provide specific learning resources, and make the "paperless" campus possible.

3.4 Effective Learning will be Replaced by Valuable Learning

In the tide of industrialization, efficiency is regarded as the core goal of capital pursuit.^[5] Effective learning is devoted to the study of the internal laws of education and teaching activities to ensure that students can master more knowledge in the limited learning time. The advent of the ChatGPT era has cast doubt on the usefulness of effective learning. In the ChatGPT era, what we learn has become more important than how we learn it, so we propose the concept of valuable learning, which aims to study the purposeful nature of education and teaching, and schools should delve into students' innermost pursuits. Generative AI like ChatGPT will push valuable learning to replace effective learning.^[6]

4 HOW DOES THE EDUCATION INDUSTRY ADDRESS CHATGPT'S CHALLENGE

ChatGPT has shown broad application prospects in the field of education, however, the shortcomings in its algorithm analysis and calculation cannot be ignored. At the same time, the high cost of implementation requires strong data, algorithms, and computing power support, which also poses certain challenges for its practical application. In addition, doubts about the credibility of the model continue to exist.^[7] Therefore, when facing the emerging technology of ChatGPT, the education industry should adopt a rational and correct attitude, make good use of this "double-edged sword" of new technology, and truly achieve "education for the people".

4.1 Changing Teachers' Responsibilities

With the development of generative artificial intelligence such as ChatGPT, the traditional knowledge-imparting-based education will be replaced. The change of educational methods requires teachers to change their teaching ideas and reposition their roles under the conditions of generative artificial intelligence education. ChatGPT doesn't have the ability to understand itself-it's possible that the output from ChatGpt might have an answer that is logical but not factual or accurate. Moreover, as a large-scale language model created by human beings, it is inevitable to have subjective factors. Ordinary users are unaware of the subjective aspects, and only high-level users can consider and properly deal with them, which puts forward higher requirements for teachers. Teachers should have a broader vision and broader knowledge, and become "super teachers" who have the ability to supervise and correct ChatGPT. Teachers need to provide intelligent guidance to guide students to accept social mainstream values and behavior norms. The role of teachers will be completely changed from knowledge teaching to wisdom guidance. They will be proficient in AI technology, guide students to accept social mainstream values and behavioral norms, understand students' emotions, and truly have educational feelings.

4.2 Reshaping Professional Orientation

Students pursue higher social status and economic returns, and face the high uncertainty of future development of various industries, the education industry should be reasonably oriented, and the professional setting should avoid ChatGPT's expertise. In the ChatGPT era, Internet fraud is becoming more and more rampant, people's psychological problems are becoming increasingly prominent, network security officers, psychological counselors and other industries will be paid more attention to, schools should keep up with the pace of The Times to set up characteristic majors. Attention should be paid to expanding courses and exploring courses. Expanding courses can help students broaden their horizons, develop interests and hobbies, and cultivate cross-border ability. Inquiry courses can cultivate students' curiosity and imagination. If the school provides students with more opportunities to learn in more fields, students will have more ability to cope with future challenges. In the ChatGPT era, it will be highly valued by the society. Diversified extension courses and inquiry courses are the most important measures for the school to meet the future social challenges.

4.3 Prevention of Credit Problems

Under the condition of generative artificial intelligence such as ChatGPT, there are some phenomena such as taking the text generated by AI as your own work, using ChatGPT to write papers, and automatically generating text through ChatGPT to complete assignments. This not only involves moral issues, but also involves the impact on human evolution. ^[8]At present, there are three main aspects to deal with the integrity problems caused by ChatGPT. One is to establish an accountability system, which involves the use of manual verification, the formulation of accountability rules, and the

watermarking of ChatGPT output content. The second is to guide honesty and credit, so that students realize that creative activities are the real internal needs of society, which is the key to cracking the integrity problem caused by ChatGPT. The third is to strengthen regulation by explicitly stating that academic journals cannot accept papers written by ChatGPT or require that the use of AI be explained as a research method.

4.4 The Government Focuses on Support

Since the beginning of the 21st century, the higher education in our country has experienced a historic leap from elite education to mass education and then to universal education. In the ChatGPT era, the universal higher education should show more diversified characteristics, otherwise it will cause the phenomenon of excessive talents in one field and the lack of talents in other fields. Only by cultivating a group of outstanding talents in various fields, it is possible to meet the challenges of ChatGPT in the future. [9] On the basis of diversification, in order to promote the development of the country, it has become an urgent need to support a number of high-level universities in various fields. When considering the key support institutions of higher learning, we can start from two dimensions: one is to meet the needs of social diversification, and the other is to improve the innovation ability of institutions of higher learning. We divide the social needs into three categories: large, medium and small, and the innovation ability and potential of academic points into three categories: high, medium and low, so as to obtain decision-making reference for the key support of discipline and professional development in colleges and universities. [10] Figure 1 lists the decision-making references for key support for the development of disciplines and majors in higher education institutions.

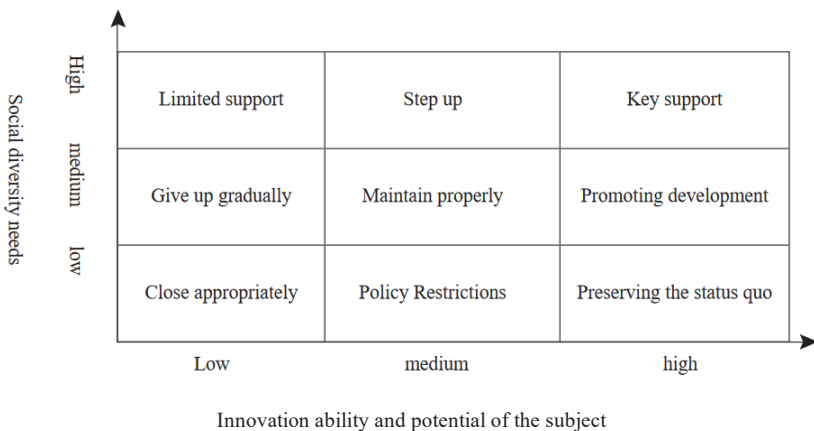


Fig. 1. Reference for decision making on the key support of discipline and professional development in colleges and universities.

There are Three Conditions for Large Disciplines and Majors that Society Needs.

The government should unquestionably focus on supporting disciplines with significant innovation capabilities. For entities with moderate innovation capabilities, the government should actively implement a series of measures to promote their development and growth, gradually become industry leaders, and guide and promote the progress of the entire industry. As for disciplines with relatively weak innovation capabilities, the government should also provide some support, but this support should be cautious and limited. After all, government resources are limited and need to be allocated reasonably.

There are Three Cases for Subjects and Majors with Intermediate Social Needs.

The government should actively promote the further development and growth of academic fields with outstanding innovation capabilities. For disciplines with moderate innovation capabilities, the government should implement stable maintenance measures to ensure the sustainable development of higher education and prevent excessive fluctuations. For disciplines with weak innovation capabilities, the government should adopt a cautious attitude and gradually consider adjustments or transformations after a comprehensive assessment of their social value and development potential. After all, the core goal of higher education is to serve the sustainable development of society. When social demand is insufficient and its subject development faces difficulties, making corresponding adjustments or gradually giving up may be a more reasonable choice.

There are Three Cases for Subjects and Majors with Small Social Needs.

Due to the continuous changes in social demands, the government should maintain its emphasis on disciplines with outstanding innovation capabilities and strive to maintain their existing advantages. The current small-scale demand does not necessarily mean weak demand in the future. The goal of retaining such an elite team is to address potential emerging demands in the future and ensure that we have the ability to face challenges. In disciplines with moderate innovation capabilities, the government should implement a series of measures, such as limiting enrollment numbers, to prevent blind expansion. This strategy helps to ensure the stable development of disciplines and avoid resource dispersion and quality decline caused by excessive expansion. For disciplines with weak innovation capabilities, the government needs to carefully evaluate and take closure measures at appropriate times to prevent limited educational resources from being wasted in areas with unclear development prospects, and ensure that educational resources are more effectively allocated to disciplines with greater potential and higher value. Although such a decision is difficult to make, it is essential for the healthy development of the entire education system.

5 CONCLUSION

This article analyzes the application of ChatGPT as an emerging technology in the field of education and its potential impact. Through reinforcement learning and human feedback techniques, ChatGPT not only supports real-time conversations, but also

efficiently performs multiple advanced tasks such as text generation, code writing, and translation. These characteristics have brought many positive changes to the education industry, including promoting personalized learning, enhancing teacher functions, promoting the realization of paperless campuses, and transforming learning methods. However, the introduction of ChatGPT is also like a double-edged sword. Although it can enhance the effectiveness of learning, it may also pose a potential threat to educational equity and quality. Therefore, the education sector needs to face these challenges rationally, effectively utilize the advantages of ChatGPT, ensure that education always serves the people, and promote the comprehensive development of all students.

From the results of this study, we conclude that ChatGPT will reshape the future of education and become a new standard for human-machine collaboration. However, in order to better utilize this tool, it is necessary to comprehensively consider the social and ethical issues that may arise after the introduction of technology. Therefore, in future research, the following directions should be explored: firstly, how to effectively integrate the advantages of ChatGPT into the existing education system; Secondly, strengthen measures to ensure educational equity and quality; The third is to redefine and train teachers' roles to adapt to the challenges of new technologies.

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