

# Potential and Risks of Generative Artificial Intelligence in Higher Education

Ke Zong, Yu Ren, Yuan Yuan\*

Shandong University of Science and Technology, Tai'an, Shandong, China

\*Corresponding Author.

**Abstract:** In order to promote the deep integration of artificial intelligence and higher education and promote innovation in the field of higher education, this paper takes the quality and efficiency of teacher education, the innovation ability of students and the management potential of educational institutions as the starting point to deeply explore the advantages and difficulties of the application of generative artificial intelligence in higher education. The analysis found that ChatGPT has significant potential in higher education applications, such as improving teachers' teaching quality and efficiency, optimizing students' learning experience, and improving the administrative ability and level of educational management institutions. However, there are also obvious risks, such as damaging the trust relationship between teachers and students, weakening teachers' teaching authority, and inducing certain academic misconduct. This paper analyzes the potential and risks of ChatGPT in higher education, and provides experience and strategy guidance for the orderly and healthy development and practical application of generative artificial intelligence in higher education in China.

**Keywords:** Generative artificial intelligence; ChatGPT; Teacher teaching; Student application

## 1. INTRODUCTION

In 2022, the release of ChatGPT, a large conversational language model, marked the technological iteration of artificial intelligence and set off a scientific and technological wave of rapid development of artificial intelligence. Among many generative artificial intelligence, ChatGPT's technical application frequency and market promotion rank first. Nowadays, the application of ChatGPT in human-computer interaction mode is realizing new knowledge inheritance, production and transformation modes between solid facts and dynamic evolution [1]. The generative artificial intelligence represented by ChatGPT has brought a great impact on education and other fields. In July 2017, The State Council issued the "New Generation of Artificial Intelligence Development Plan", which clearly pointed out that we should firmly grasp the major historical opportunities for the development of artificial intelligence [2]. At the same time, in order to better embed artificial intelligence technology in education and improve the effectiveness of education,

it is clear that the research and application of ChatGPT in higher education also has huge potential, and it is of great significance for its high-quality development and talent training to study and judge its potential risks and effectively avoid them [3].

In 2023, at the National People's Congress and the Chinese People's Political Consultative Conference, NPC deputies and CPPCC members discussed the generation of poor gbt as a representative and the impact of artificial intelligence on the field of education, and made an in-depth analysis of the current challenges faced by the field of education and the countermeasures that need to be taken [4]. On February 25, 2023, the symposium "ChatGPT and Educational Innovation" was held in Shanghai. The conference focused on topics such as the way ChatGPT changes education, the actions of educators to deal with ChatGPT, and the reform of education and teaching based on ChatGPT. The content covered the features of intelligent technology represented by ChatGPT, the impact on teaching and learning, the ethics of development, the current situation of use and future prospects. The conference presented the development status of ChatGPT at that time from the perspective of multiple fields and disciplines, and discussed its impact and influence on the field of education, in order to promote the development of interdisciplinary research and application. On August 18, 2023, the 2023 Global Smart Education Conference "Generative Artificial Intelligence and the Future of Education" forum was held in Beijing. The opportunities and challenges brought by generative artificial intelligence to education, the reshaping of education form, man-machine collaborative teaching, and the ethics of artificial intelligence education application are discussed in depth. To sum up, the generation represented by ChatGPT is the application of artificial intelligence, which has both positive and negative impacts on the field of higher education.

## 2. THE POTENTIAL OF CHATGPT IN HIGHER EDUCATION

(1) Man-machine collaboration to improve teachers' teaching efficiency and quality:

1) Provide teaching resources and inspiration to assist teaching design

A variety of channels and paths are selected from the included database to help teachers quickly and accurately obtain all kinds of teaching materials,

detailed cases and innovative ideas closely related to teaching, so as to greatly enrich the teaching content and enhance the vividness, interest and attraction of the classroom. At the same time, it also provides teachers with clear ideas and valuable suggestions on teaching design, and encourages teachers to continuously optimize and improve the teaching process, which is mainly reflected in shortening the time for preparing lessons, so as to improve the teaching efficiency and quality, more effectively meet the learning needs of students, and promote the all-round development of students. For example, Ian Bogst, a professor at the School of Computer Science and Engineering at Washington University in St. Louis, believes that using ChatGPT to make course Outlines can greatly improve teaching efficiency, save a lot of time for preparing lessons, and enable teachers to devote more energy to classroom teaching activities. Moreover, the course Outlines formulated through ChatGPT are more reasonable. It can also ensure the comprehensiveness and consistency of the teaching content [5].

## 2) Personalized teaching support and targeted evaluation standards

In daily teaching, ChatGPT can go deep into the individual characteristics and different needs of students, and according to the information collection and analysis, provide highly personalized teaching guidance and suggestions for specific teaching situations, making it more targeted and practical. Moreover, ChatGPT has demonstrated excellent performance in generating a wide variety of different types of test questions covering a wide range of content and formats in an efficient and fast manner. It can generate a ladder of difficulty levels and formulate a very accurate feedback template to ensure the accuracy and fairness of the evaluation. In addition, it can fully guarantee the diversity and comprehensiveness of the test content through detailed and comprehensive customized Settings, and thus provide solid support for more accurate assessment of student learning effects, playing an indispensable role in the entire teaching process [6].

## (2) To enable learning, enhance students' learning experience and effect

1) Personalized interaction: Through personalized dialogue with students, it can accurately understand the expression of students, acutely capture the intention and needs of students, and meet the needs accordingly. On this basis, it will generate personalized responses, explanations and guidance according to the specific situation of students. At the same time, it can also provide appropriate feedback and suggestions based on the students' answers and performance. In addition, ChatGPT skillfully guides personalized topic discussions based on students' interests and needs to stimulate learning. ChatGPT can generate interesting interactions based on topics provided by students. ChatGPT technology is applied

to intelligent chatbots, which can conduct interactive questions and answers autonomously, continuously pay attention to students' learning progress, and adjust interactive methods and contents in real time to achieve more effective personalized interactions. Help it save a lot of time and money [7] Students can expand their knowledge and vision and improve their creativity in a relatively relaxed atmosphere.

2) Timely tutoring: ChatGPT can generate highly targeted and timely tutoring content based on a variety of questions or needs provided by students with great efficiency and precision. As a result, students can easily and conveniently obtain timely and efficient learning assistance at any time and any place, thus greatly enhancing their own learning initiative. This personalized learning support model is not only of vital significance for improving students' satisfaction and adherence to the course, but also helps to significantly improve the retention rate of the course and its affiliated university, and its importance and value are obvious. For example, Stanford University's Information Technology department guided ChatGPT to provide the desired responses by providing a basic training guide on ChatGPT, designed to help students effectively use ChatGPT for almost any task requiring content generation, information retrieval, or human-like conversation. Provide strong support for academic research and project implementation [8].

## (3) Promote teaching virtually and bring into play the management potential of educational institutions

### 1) Improve the work efficiency of educational institutions

On the one hand, in the field of application consultation, ChatGPT essentially has the function of consultant. Through in-depth analysis and understanding of the questions raised by the questioner, it can mobilize its powerful language processing ability and rich knowledge reserve, and accurately generate exact answers or provide valuable suggestions for the questioner. It provides professional information and guidance in a variety of areas to meet the diverse needs of the questioner. On the other hand, in the field of writing and editing official documents, ChatGPT can generate relevant notices, reports and meeting minutes for faculty members through its own automatic processing, which can significantly reduce the workload of higher education institutions, and because its generated content is written according to certain guiding principles [9], it is more standardized. It can also improve the quality of official document writing to some extent. It is concluded that ChatGPT can provide effective and convenient management support for higher education institutions in the administrative application of higher education, which is conducive to improving management efficiency and quality.

### 2) Increase the level of specialization in the services

of higher education institutions

ChatGPT can generate professional services and support based on different service areas, service content, service standards, etc. In this way, higher education institutions can demonstrate their professional knowledge and skills, improve the trust and availability of services, show their technical advantages in college enrollment, and have more technical support in teaching. At the same time, ChatGPT can also generate professional management support according to different domain standards to show more professional knowledge and skills to improve the availability of services. For example, this specialization can be applied to provide students with career guidance services, and at the same time stimulate students' interest in planning their career future and exploring their personal career potential and development space [10]. It can be concluded that ChatGPT can enhance the service capability of educational institutions and improve the service quality in higher education.

### 3. RISKS OF CHATGPT IN HIGHER EDUCATION

#### (1) Ethical dilemmas and the elimination of teachers' authority status

It is worth noting that ChatGPT has a "technical black box" problem because the usual answers given by ChatGPT are opaque and uninterpretable. In other words, ChatGPT only gives answers, but cannot explain them, which is a significant shortcoming of traditional teachers' offline teaching, because ChatGPT's learning data mainly comes from network data, which may lead to risks such as time delay in generating answers and insufficient data support. In addition, ChatGPT may "generate illusion" and construct seemingly logical facts or conclusions, which may even lead to problems such as knowledge blindness, concept abuse and misuse. However, if students are convinced of the "logic" of the generated answers, they will accept misleading information. There are also some common problems with ChatGPT, such as algorithmic discrimination, which is prone to certain potential discrimination and bias. Relevant research results show that ChatGPT has a certain degree of racial discrimination and professional debasement at the algorithm level. Under the trend of the above analysis, when the generated answer deviates from the traditional teacher's teaching, students will ignore the teacher's guidance and even destroy the trust relationship between teachers and students due to their excessive reliance on and trust in artificial intelligence. On this basis, it is also necessary to point out that the role of teachers is not only the imparts of knowledge, but also the guides of students' growth, emotional supporters and value shapers. These aspects are difficult to be completely replaced by artificial intelligence, and teachers still have an irreplaceable important position and role. However, with the continuous development of artificial intelligence

technology, it is increasingly widely used in the field of education. To a certain extent, the emergence of artificial intelligence may have some impact on the authority of teachers, which is mainly reflected in the confusion between teachers and students about their role positioning and sense of value, and finally the imbalance of teaching meaning and goal identification. For example, artificial intelligence has a huge knowledge base and can provide students with knowledge more accurately than traditional teachers, which is a challenge in knowledge transmission. Compared with traditional teaching evaluations, AI-based evaluation systems may pay more attention to objective data, so that some students and parents will trust machine evaluations more than human evaluations with certain subjective ideas. From the perspective of teaching methods, the emergence of artificial intelligence can promote teaching methods to be more personalized and intelligent, which will arouse students' learning interest more than traditional teaching methods. The above is the evidence that students no longer rely on teachers completely, which leads to the dissolution of teachers' authoritative status.

#### (2) The abuse of technology leads to the decline of students' innovation and thinking initiative

The powerful function of ChatGPT lies in its powerful data collection and analysis ability, which can help students provide accurate answers, push learning resources, and complete learning tasks through simple wrong answers, which inevitably makes students rely on ChatGPT technology, leading to technology abuse.

The abuse of artificial intelligence technology may indeed bring some negative effects, leading to a decline in students' creativity and learning initiative. When students over-rely on AI to complete tasks or obtain answers, they may reduce their own opportunities to think and explore, becoming accustomed to directly accepting ready-made results, thus inhibiting the development of creative thinking. Moreover, the overuse of AI may also make students lazy, lack motivation and enthusiasm for active learning, and get used to being "fed" knowledge rather than actively exploring and learning.

#### (3) Increased risk of academic misconduct

The abuse of AI technology will gradually erode students' autonomy, creativity, and critical thinking skills. At the same time, the improper use of AI technology may lead to a series of academic misconduct problems. In the academic field, these problems are manifested in the direct generation of papers with the help of artificial intelligence technology, or the use of artificial intelligence to generate some references that do not actually exist before the paper is written. Based on this, when students use ChatGPT, if they fail to obtain the authorization of the right subject, plagiarism and other phenomena are likely to occur, which seriously

undermines the basic principle of academic integrity, and thus the authenticity of academic research is greatly questioned. In addition, artificial intelligence may also be used to falsify data or experimental results, and may also be used by criminals to create false academic results and disrupt academic order. In addition, the rapid development of artificial intelligence has made it more difficult to detect and prevent academic misconduct, which poses new challenges to maintaining academic integrity.

#### 4. CONCLUSION

This paper aims to explore the potential and risks of ChatGPT in higher education, with a comprehensive analysis and discussion from teachers, students, and governing bodies as intermediaries. Artificial intelligence has demonstrated a number of significant benefits in higher education. Through man-machine collaboration, artificial intelligence can greatly improve the teaching efficiency and quality of teachers, provide teachers with more powerful support and assistance, and make the teaching process more efficient and accurate. At the same time, artificial intelligence empowers learning, can effectively improve students' learning experience and effect, provide personalized learning paths and resources, and stimulate students' learning interest and initiative. In addition, artificial intelligence also plays an important role in the virtual promotion of education, helping educational management institutions to better realize their management potential and optimize educational management processes and decisions. However, at the same time, AI also inevitably brings some drawbacks and challenges in higher education. It may weaken the authority status of teachers in education and make the role and function of teachers face certain adjustment and change. In addition, the application of artificial intelligence may increase the inertia of students, resulting in the reduction of students' innovative ability, which is not conducive to the cultivation and development of students' creativity. In addition, the application of AI may also increase the risk of academic misconduct and pose a certain threat to academic integrity and norms. In view of this, in the process of actively using artificial intelligence to promote the development of higher education, we must pay great attention to and seriously solve the various challenges it brings. First, through educational guidance, students should be enhanced in terms of academic ethics and integrity awareness, so that they can deeply understand the harm caused by excessive reliance on artificial intelligence. To reduce the threat to the authority of teachers, it also requires teachers to constantly enrich themselves, so as to truly improve their teaching level. Second, improve students' independent learning ability simultaneously, cultivate their independent thinking and problem-solving ability, so as to reduce excessive dependence on external tools. Third, homework

design should be carefully designed with more challenging and open homework, encourage students to make full use of their own knowledge and ability to complete. Fourth, in terms of classroom interaction, classroom discussion and group activities can be appropriately increased to actively promote students' participation and communication. Fifth, in terms of evaluation methods, we should adopt diversified evaluation methods, not limited to written results. Sixth, this is the last and most necessary step, teachers need to strengthen the supervision and management of students' homework and learning process, and effectively solve the adverse phenomenon of directly using artificial intelligence to generate homework. Through the supervision of students' learning process, academic misconduct can be effectively reduced. This requires regular inspection of students' learning progress and homework completion, random sampling of learning materials to ensure their authenticity, requiring students to record key steps and thinking processes in the learning process for traceability, frequent interaction with students to detect problems in time, the use of technical means such as repetition software for detection, and continuous strengthening of academic ethics and integrity awareness education in the supervision process. Multi-pronged, together to create a good academic environment. Only in this way can we give full play to the unique advantages of artificial intelligence, skillfully resolve its potential risks, and realize the coordinated, unified and sustainable development of higher education in terms of quality, scale and efficiency, so as to cultivate "smarter questioners" and "more prominent creators" rather than mechanical transmitters of answers. Promote the rational and efficient application of generative artificial intelligence in higher education, and provide a solid guarantee for training high-quality talents to meet the needs of The Times.

#### ACKNOWLEDGMENT

This work was supported in part by a grant from 2022 Higher Education Science Research Planning Project (22JS0401), Shandong University of Science and Technology Star Program Project (QX2023ZD15), Shandong Province Education Science "14th Five Year Plan "2023 Annual Project (2023ZD061).

#### REFERENCES

- [1]Zhou Hongyu, Chang Shunli. Future prospects, potential risks and governance of generative artificial Intelligence embedding in higher education. *Modern Educational Management*, 2023 (11): 1-12.
- [2]Notice of The State Council on Issuing the Development Plan of the New Generation of Artificial Intelligence (Guofa [2017] No. 35). (2017-07-08)[2024-02-11]. [https://www.gov.cn/zhengce/zhengceku/2017-07/20/content\\_5211996.htm](https://www.gov.cn/zhengce/zhengceku/2017-07/20/content_5211996.htm).
- [3]Jin Ping Xi presided over the fifth collective study

session of the Political Bureau of the CPC Central Committee and delivered an important speech.[2023-09-23].[https://www.gov.cn/yaowen/liebiao/202305/content\\_6883632.htm](https://www.gov.cn/yaowen/liebiao/202305/content_6883632.htm).

[4]Liu Bozhi. What ChatGPT means for education [EB/OL].[https://paper.jyb.cn/zgjyb/html/2023-03/05/content\\_620715.htm?div=-1](https://paper.jyb.cn/zgjyb/html/2023-03/05/content_620715.htm?div=-1), 2023-03-05.

[5]What is the Role of AI in Your Classes? [EB/OL]. [2023-09-23].<https://search.wustl.edu/s/search.html?collection=wustlsearch&f.Tabs%7Cwustl-engineering-web%2Cwustlpeople-ldap%2Cwustl-news-recent-web%2Cwustl-news-full-web%2Cwustl-medicine-web%2Cwustl-mainweb%2Cwustl-library-web=All+Results&query=Chat+GPT+Ian+Bogost>.

[6]ChatGPT and Assessment in Higher Education.[2023-09-23].[https://c21u.gatech.edu/sites/default/files/publication/2023/03/C21U%20ChatGPT%20White%20Paper\\_Final.pdf](https://c21u.gatech.edu/sites/default/files/publication/2023/03/C21U%20ChatGPT%20White%20Paper_Final.pdf).

default/files/publication/2023/03/C21U%20ChatGPT%20White%20Paper\_Final.pdf.

[7]Yale Poorvu Center for Teaching and Learning.AI Guidance for Teachers. [2023-09-23].<https://poorvucenter.yale.edu/AIguidance>.

[8]Stanford.Level Up Your ChatGPT Skills: From Basics to Advanced Techniques. [2023-09-23].<https://uit.stanford.edu/service/techtraining/class/how-best-use-chatgpt-basic-training-guide>

[9]GENERATIVE AI EMPLOYEE RESOURCES.[2023-09-23].<https://provost.unc.edu/generativeai-employee-resources/>.

[10]10 Ways to Use ChatGPT to Land a Great Job. [2023-09-23].<https://cdo.som.yale.edu/blog/2023/04/29/10-ways-to-use-chatgpt-to-land-a-great-job/>.