

The Reform and Integration of Higher Education in the ChatGPT Era

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Abstract: The development of artificial intelligence is related to the future direction of the world. As an important component of the new round of technological revolution, artificial intelligence has brought new challenges and opportunities to the development of higher education. ChatGPT quickly garnered widespread attention and discussion, particularly in the education sector, soon after its launch. Its technical features and advantages significantly enhance the interactive experience, offering broader application prospects. This includes more comprehensive and diverse learning resource integration, personalized learning plan development and guidance, and addressing the challenges posed by artificial intelligence technologies like ChatGPT. In the field of higher education, exploration and practice can be carried out to empower governance capabilities with digitization, promote teacher team construction with artificial intelligence, and empower future talent cultivation with intelligent technology. Analyzing the technical characteristics, advantages, and application prospects of ChatGPT in university student learning will help to understand the deep logic behind these hidden concerns and thus better establish the form and content of artificial intelligence technology assisting university student learning. Evaluation and supervision mechanisms to accelerate the deep integration of intelligent technology with higher education.

Keywords: Artificial Intelligence; ChatGPT; Higher Education, and Application Prospects in Universities.

1. Introduction

Large language models, such as ChatGPT, are natural language processing technologies used for text vector representation and generation probability. ChatGPT has recently gained widespread attention in the education field due to its strong generation, comprehension, logical reasoning, and dialogue capabilities [1]. While research on its educational applications is emerging, there is still insufficient exploration of effectively utilizing different technical approaches of large language models, particularly in higher education. At the end of 2022, ChatGPT, an intelligent chatting tool developed and launched by OpenAI in the United States, with its unique advantages in natural language processing and dialogue generation, foretells a broad application prospect in higher education, especially in providing personalized learning support and instant learning tutoring for students in higher education, but it also triggers concerns in the education and academic sectors. Compared with other pre-trained language models, ChatGPT has a larger model size and number of parameters, more learning resources and possible application scenarios; it has better language comprehension and generation capabilities and can deal with complex situations such as multiple rounds of conversations and context-awareness at the same time. Considering the background basis of the large language model, ChatGPT is a conversation generation model based on artificial intelligence technology. This paper discusses the impact of artificial intelligence on higher education from the perspective of different majors in higher education, analyzes ChatGPT and whether it can be applied in different majors, searches for the reform and integration of artificial intelligence in higher education, lays the foundation for establishing the form, content, evaluation, and supervision mechanism of AI technology-assisted learning for students in colleges and universities, and provides students in colleges

and universities with a broader and long-term academic and career planning reference, career planning reference for college students.

2. Application and Impact of Artificial Intelligence in Higher Education as Represented by ChatGPT

On April 15, 2023, the China Engineering Science and Technology Forum on "Artificial Intelligence Enabling Education," hosted by the Chinese Academy of Engineering and co-sponsored by Xi'an Jiaotong University and the International Knowledge Center for Engineering Science and Technology (IKCEST) of UNESCO, will focus on the new paradigm of AI-enabled education, Focusing on the new paradigm of AI-enabled education, human factors, cognitive environment, big data knowledge engineering and other cutting-edge issues and important directions in the integration of information technology and education, the Forum invited several academicians of the Chinese Academy of Engineering and presidents of colleges and universities to attend the Forum to give special reports. Pan Yunhe, an academician of the Chinese Academy of Engineering and former president of Zhejiang University, believes that from the perspective of the history of human development, artificial intelligence is a change in the way of human evolution [2]. In addition to the curriculum, the way of learning has also become diverse, in the past, teachers spoke, and students memorized now in addition to the classroom teaching, but also to operate the practice of learning tools has become more and more important, compared with the simple and direct learning tools in the past, the future of ChatGPT will become an important learning tool. Artificial intelligence has become a powerful tool for writing, answering questions, and learning, and it can make up new teaching materials in real-time from papers, books and data, which has changed the situation of hundreds,

thousands or even tens of thousands of people using the same textbook in the past. ChatGPT is practiced in colleges and universities, including the Hong Kong University of Science and Technology (Guangzhou Branch), which has been established for 32 years and is the first school in China to carry out the reform of enrollment of master's degree students in large categories, which has cultivated a very large number of talents. For example, the chief technology officer of Xiaomi's artificial intelligence assistant, Xiao Ai Classmate is a student who graduated from the computer science program of the Hong Kong University of Science and Technology. The Hong Kong University of Science and Technology realized the importance of cross-disciplines more than a decade ago, and the Hong Kong University of Science and Technology (Guangzhou) has carried out reforms in talent training and teaching. Their talent cultivation and teaching reforms show that the technology-enabled higher education system, the need for personalization, the need to reconfigure the teacher-student relationship, and the need for the use of tools, tutoring, and support are the general trend, and their specific reforms:

1. break through the resource constraints of the popularization stage, and establish personalized learning programs.
2. improve teacher-student relationships and establish higher-order, high-quality communication and counseling.
3. integrate massive resources to assist students' thinking process.

2.1. The Impact of Artificial Intelligence and ChatGPT on College Faculty Workers

The emergence and popularization of Artificial Intelligence (AI) and ChatGPT are profoundly affecting the work style and teaching mode of university teachers. This impact can be summarized in the following aspects: innovation of teaching methods, assistance in academic research, improvement of work efficiency, and transformation of teachers' roles. First, AI and ChatGPT promote the innovation of teaching methods. The traditional classroom teaching model is usually teacher-centered and teaches fixed course content [3]. However, AI and ChatGPT make personalized teaching possible. Teachers can use AI technology to customize the teaching content and methods according to students' learning progress and comprehension. For example, with ChatGPT, teachers can recommend reading materials and practice questions for each student that are appropriate for his or her learning level, thus improving learning outcomes. In addition, ChatGPT can assist teachers in interacting in the classroom, answer students' real-time questions, and promote interaction and communication between teachers and students. Second, AI and ChatGPT play an important supporting role in academic research. Researchers can use AI technology for data analysis, literature review, and experimental design to significantly improve research efficiency. For example, ChatGPT can help teachers quickly retrieve relevant literature, generate review reports, and even provide algorithmic suggestions during data analysis. These features not only save teachers a lot of time and energy, but also improve the accuracy and depth of research. In addition, the application of AI and ChatGPT greatly improves the work efficiency of college teachers. Daily administrative tasks and course management often take up a lot of teachers' time. With AI technology, these tasks can be automated. For example, ChatGPT can assist teachers in grading assignments, recording grades, managing student records, etc., thus giving teachers more time to focus on teaching and research. The automated process not only

reduces the possibility of human error, but also improves the accuracy and efficiency of the work. Moreover, the popularization of AI and ChatGPT is leading to a shift in the role of teachers. With the development of information technology, teachers are no longer just transmitters of knowledge, but also guides and facilitators of learning. Teachers need to keep learning and adapting to new technologies to better assist their students in the learning process. At the same time, teachers need to be able to think critically and creatively to help students identify and apply knowledge in the age of information explosion. Overall, AI and ChatGPT are comprehensively impacting the way college and university faculty work. While this brings many opportunities and conveniences, it also places higher demands on teachers. Teachers need to continually improve their technical skills and teaching abilities to adapt to the rapidly changing educational environment. In the future, with the further development of AI technology, the way college teachers work and teach will continue to change profoundly, bringing more innovation and possibilities to education.

2.2. The Impact of Artificial Intelligence and ChatGPT on College Students

The use of Artificial Intelligence (AI) and ChatGPT in colleges and universities has many positive impacts on students as well as some potential challenges and issues that accompany them. The following are their main benefits and negative impacts on students in higher education. There are three main benefits: 1. Personalized Learning and ChatGPT can provide a learning experience that is tailored to a student's learning speed and comprehension [3]. This personalized learning can help students to better master their knowledge and improve their learning efficiency. For example, by analyzing a student's learning history and performance, AI can reinforce learning by recommending learning materials and practice questions that are appropriate for his or her level. 2. Supplementary Learning Resources. AI and ChatGPT can provide students with a wealth of learning resources, including video lectures, interactive exercises, and detailed explanations. These resources can help students gain a deeper understanding of course content and expand their knowledge. For example, students can utilize ChatGPT-generated explanations to supplement classroom learning and understand problems from multiple perspectives. 3. Improved writing and research skills. ChatGPT can help students improve their writing by providing grammatical corrections and structural suggestions to enhance academic writing. In addition, AI tools can assist students in data analysis, literature review and other research work, improving research efficiency and quality. However, there are four disadvantages: 1. Dependency problem. Students may rely too much on AI and ChatGPT to complete assignments and solve problems rather than thinking and learning on their own. This dependency can weaken students' independent thinking and problem-solving skills, affecting their long-term academic development. 2. Information accuracy. Although AI and ChatGPT provide accurate information in most cases, there may be occasional errors or misleading content. If students do not have sufficient critical thinking skills, they may blindly accept wrong information, leading to misunderstanding and confusion in learning. 3. Privacy and security issues. Students' use of AI tools may involve the input of personal data and private information. If these data are not properly protected, they may be exposed to privacy breaches and security risks.

In addition, the data collection and analysis processes of AI systems may raise ethical and legal issues.⁴ Unfair competition. Students with greater technological skills and resources may have an advantage over those who do not have access to equivalent technological support, which may exacerbate educational inequities. For example, students with less financial resources may not have access to the same advanced AI learning tools, thus putting them at an academic disadvantage.

3. AI, ChatGPT Convergence and Reform Impact of Major Field Specializations in Higher Education

In higher education, ChatGPT has undergone significant changes in the way it is used, evolving from an early basic tutoring tool to the comprehensive educational platform it is today. This shift is reflected in several ways, including personalized learning, instructional assistance, research support, and academic writing. First, the application of ChatGPT in personalized learning has been significantly enhanced. In the past, ChatGPT was primarily used to answer simple questions from students and provide basic academic support. However, with advances in technology, ChatGPT is now able to provide customized learning solutions based on a student's learning style and progress. This not only improves learning efficiency, but also helps students better grasp complex concepts. For example, by analyzing a student's learning history and knowledge mastery, ChatGPT can recommend appropriate learning materials and practice questions, thus enabling personalized teaching. Second, the use of ChatGPT for instructional support has taken a quantum leap. Teachers can now utilize ChatGPT to design course content, create test questions, and assess student performance. This application not only reduces teachers' workload, but also improves the quality and efficiency of teaching. For example, ChatGPT can generate corresponding teaching plans based on the course syllabus and teaching objectives, and provide diversified teaching resources to help teachers better organize classroom activities. In addition, the application of ChatGPT in research support is becoming more and more widespread. Previously, researchers mainly used ChatGPT to find literature and obtain simple information. Today, ChatGPT can help researchers analyze data, generate research reports and provide professional academic advice. For example, researchers can use ChatGPT to analyze a large number of datasets to identify potential patterns and trends, thus providing strong research support. Meanwhile, ChatGPT can also help write and edit research papers to improve the quality and efficiency of academic writing. Moreover, the application of ChatGPT in academic writing has been greatly improved. In the past, students mainly used ChatGPT to correct grammatical errors and improve their writing style. Now, ChatGPT can provide more in-depth writing guidance, such as helping students conceptualize the structure of their papers, provide references, and perform logical analysis. This advanced writing support not only improves students' writing skills, but also develops their critical thinking skills. In summary, the application of ChatGPT in higher education has evolved from a simple tutoring tool to a multifunctional educational platform. By providing personalized learning solutions, teaching aids, research support and academic writing guidance, it has provided great help and impact to all fields of majors in colleges and universities. And artificial

intelligence is most likely to hit simple, repetitive labor and professions with well-defined rules.

3.1. The Impact of Artificial Intelligence and ChatGPT on the Accounting Profession Reform and Convergence

The integration of ChatGPT and AI in higher education is transforming the accounting profession, introducing numerous innovations and driving significant reforms. These technologies have brought many innovations to the accounting profession. For example, innovations in teaching methods: 1. Personalized learning. AI and ChatGPT offer customized learning experiences based on individual progress. By using data analytics, AI identifies students' weaknesses and recommends suitable resources and practice questions, enhancing learning efficiency and comprehension of complex accounting concepts. 2. Real-time feedback and tutoring. ChatGPT provides instant answers and feedback, assisting students with academic problems and promoting self-directed learning [3]. AI also simulates real accounting scenarios, allowing students to apply their knowledge in practical situations and enhance their skills.

There are also improvements in course design: 1. Data analysis and visualization. AI modernizes course design through data analysis and visualization. Instructors can incorporate big data analytics, machine learning, and predictive modeling into the curriculum, helping students master cutting-edge techniques and improve job market competitiveness. 2. Case-based teaching and simulation labs. AI and ChatGPT create complex case simulations, allowing students to perform real-world operations in a virtual environment. This method helps students apply theoretical knowledge to practical problems, enhancing their problem-solving abilities.

While the use of AI and ChatGPT in the accounting profession offers many benefits, there are also some potential harms and negative impacts 1. Over-reliance on technology. Excessive dependence on AI and ChatGPT can undermine independent thinking and professional judgment, as students may rely on AI-generated results without critical verification. 2. Information accuracy issues. While generally accurate, AI and ChatGPT can sometimes produce errors or misleading content, leading to significant financial decision-making mistakes and affecting the accuracy of financial reporting. 3. Privacy and data security. The use of AI in accounting involves handling sensitive financial data, and raising privacy and security concerns [4]. Without proper security measures, sensitive information can be compromised, leading to legal and trust issues.

3.2. The Impact of Artificial Intelligence and ChatGPT on the Programming Profession Reform and Convergence

Artificial intelligence, including large language models like ChatGPT, makes querying and analyzing historical and literary records easier. In programming education, AI and ChatGPT significantly enrich teaching methods. For instance, ChatGPT can quickly answer programming questions, explain code and algorithms, and provide instant feedback, helping students correct errors and deepen their understanding promptly. AI can also offer personalized learning paths and resource recommendations based on student's progress and comprehension. This includes AI-

generated practice questions and project examples targeting weaknesses to improve learning efficiency and effectiveness. Students can use these technologies for self-learning at any time, addressing programming challenges they encounter. For example, ChatGPT can provide detailed answers and guidance when students face coding problems. AI can assist with code generation, debugging, and optimization, improving programming efficiency and code quality by automatically generating preliminary code frameworks for students to refine. Additionally, AI can perform code reviews to identify errors and vulnerabilities, enhancing code security and reliability.

However, there are potential risks and problems associated with their use in programming majors, such as: 1. Over-reliance on technology. Students and professionals might become too dependent on AI and ChatGPT, neglecting their ability to think and solve problems independently. This can weaken their programming skills and creativity, impacting their career development. For example, relying on AI to generate code without understanding algorithms and data structures may leave them unprepared for complex problems. 2. Inaccurate and unreliable information. While AI and ChatGPT generally provide accurate information, they can also produce errors or misleading content. In programming, subtle mistakes can have serious consequences. Blindly trusting AI solutions without independent validation can lead to code vulnerabilities and functional flaws. 3. Inability to ensure data privacy and security. Using AI and ChatGPT for programming involves handling significant amounts of code and project information, raising concerns about data privacy and security. Without proper protection during transmission and processing, data may be at risk of leakage and misuse, leading to intellectual property infringement and security risks.

3.3. The Impact of Artificial Intelligence and ChatGPT on the literature and history Profession Reform and Convergence

Innovations in literature and history programs with AI technologies like ChatGPT have significantly enriched teaching and learning resources. Traditional methods rely on classroom lectures and books, whereas AI provides a more diverse and interactive experience. ChatGPT can generate learning materials, explain complex events or literary works, and offer real-time Q&A, improving efficiency and understanding. AI also provides personalized learning paths and resource recommendations based on students' progress and interests, enhancing relevance and engagement. For researchers, AI and ChatGPT are powerful tools for processing and analyzing large text datasets, extracting valuable information, and revealing hidden patterns in historical documents or literary works. AI can quickly screen literature and summarize research trends, saving time and energy. Additionally, AI facilitates interdisciplinary and cross-regional collaboration by translating and analyzing literature in different languages, promoting international academic communication. However, there are helpful and good impacts as well as bad impacts and potential problems, such as: 1. Information accuracy and reliability. AI-generated information is not always accurate, especially in complex fields like literature and history. Over-reliance on AI without independent verification can lead to biased research. 2. Data

Privacy and Security. The use of AI involves handling personal data and research materials, raising concerns about privacy and security. Improper protection can lead to data leakage and misuse.

In this regard, colleges and universities, teachers and students in major higher education should make corresponding countermeasures and solutions: 1. Strengthen technical education and critical thinking training. Universities should strengthen technical education in literature and history majors, teaching students the basics of AI and ChatGPT [4]. Emphasizing critical thinking and independent research skills encourages students to question and verify AI-generated information. 2. Establishment of data security and privacy protection mechanisms. Universities should establish robust data security and privacy protection mechanisms, using encryption and access control measures to prevent data leakage and misuse. 3. Promote technology popularization and fair use. Ensuring equal access to AI and ChatGPT technologies for all students and researchers helps narrow the education gap. Providing technical training and resource support aids those lacking resources. 4. Strengthen multidisciplinary cooperation and international exchanges. Utilizing AI for interdisciplinary and international research broadens horizons and deepens understanding, fostering academic innovation and knowledge sharing.

4. Conclusion

The integration of AI and ChatGPT in higher education has revolutionized teaching and learning across all fields of specialization. These technologies have introduced innovation and reform, making education more interactive, personalized, and efficient. To fully harness these advancements, students and institutions must actively embrace these changes while fostering critical thinking and independent problem-solving skills. Society should collaborate to promote the widespread and rational application of AI, ensuring data security and educational equity. Students can leverage AI and ChatGPT for professional learning and future planning, enhancing their knowledge and skills through personalized learning, real-world projects, and academic research. This preparation is crucial for their future career development. The use of AI and ChatGPT in higher education is driving profound changes, transforming teaching, learning, and career preparation across disciplines, from accounting to programming to the liberal arts and history.

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