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A Study of ChatGPT Empowering College Students' Innovation and Entrepreneurship Education in the Context of China

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Abstract: *As a cutting-edge innovation in artificial intelligence technology for social users, the emergence of ChatGPT is poised to have a profound impact on the realm of higher education. Incorporating intelligent technologies like ChatGPT to foster innovation and entrepreneurship education among college students is a crucial challenge that demands attention. In this regard, the obstacles faced by higher education institutions, such as inadequate teaching methods, incomplete teaching systems, and inefficient allocation of educational resources, must be addressed to better support students' entrepreneurial ambitions and aspirations. This paper endeavors to provide some insights and answers to this question, aiming to offer practical guidance to educators involved in innovation and entrepreneurship education for college students, on how to effectively integrate artificial intelligence technology in their teaching practices.*

Keywords: *ChatGPT; Artificial Intelligence; Innovation and Entrepreneurship Education*

1. Introduction

COVID-19 is an intergenerational challenge in many aspects, which has brought a serious impact on the stability of human society. But at the same time, it has also become a catalyst for the United development and collaborative innovation of human beings. It is an excellent example to realize the potential of artificial intelligence (AI) and machine learning (ML) in drug discovery and use algorithms to find antiviral drugs that can inhibit SARS-CoV-2. [1] The impact of intelligent technology has permeated every facet of human existence. The rapidly expanding development of intelligent technology has led to the widespread adoption of the latest generation of artificial intelligence technology, with its focus gradually shifting to the realm of education. Notably, since 2019, the American Association for Information Technology in Higher Education (EDUCAUSE) has identified artificial intelligence as a trending and core technology that will significantly influence the growth of higher education. This has been highlighted in their Horizon Report: Teaching and Learning Edition for four consecutive years. The groundbreaking effects of artificial intelligence technology on traditional education have prompted educators to consider more deeply how to effectively incorporate artificial intelligence into teaching practices. In light of the recent surge in generative artificial intelligence research and development, ChatGPT has emerged as a leading contender in the market competition for artificial intelligence chat robot applications, sparking widespread discourse on the potential implications of this technology.

ChatGPT is a large-scale language training model developed by the American artificial intelligence research laboratory OpenAI. It was launched on November 30th, 2022, and is also known as GPT-3.5. ChatGPT is an upgraded version of the GPT-3 model and is specifically designed as a chatbot by OpenAI. Within a week of its launch, ChatGPT had already acquired over one million registered users. As of January 2023, the number of monthly active users on ChatGPT has grown exponentially to reach one hundred million, making it the fastest-growing consumer application in history. It is worth noting that it took TikTok approximately nine months and Instagram two and a half years to reach the milestone of one hundred million monthly active users. Due to its robust knowledge repository, semantic comprehension, and reasoning abilities, ChatGPT is seen as having the potential to empower teaching innovation and reshape the educational landscape by meeting various demands for teaching tools. Currently, research in the education sector has widely recognized ChatGPT's capability to positively impact education. [2]

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In recent years, there has been an increasing number of young faces emerging in the field of science, especially in China. According to data from "Chinese Youth in the New Era," a publication by the News Office of the State Council of the People's Republic of China, the average age of the team behind China's FAST telescope research is only 30 years old. Additionally, the average age of the team behind China's supercomputing application, which won the prestigious Gordon Bell Prize in the field of supercomputer applications, is 34 years old, and the average age of the core members of the Beidou satellite team is 36 years old. These vivid statistics demonstrate the spirit of progress and hard work among China's young people in the new era. Whether it is to achieve the goal of building a strong technology nation or to construct a new development pattern, it is necessary to deepen the promotion of mass entrepreneurship and innovation. College students are the driving force behind mass entrepreneurship and innovation, and supporting their innovation and entrepreneurship is of great significance. Entrepreneurship education for college students is an important means of enhancing their innovation and entrepreneurship abilities, fostering their entrepreneurial spirit and consciousness. It is also a product of the cross-disciplinary integration of knowledge, and an outcome of the accelerated integration and penetration of scientific technology and the development of the economy and society. [3] In recent years, the technological innovation capacity and level of Chinese universities have significantly improved. However, with the increasing pace of technological iteration and social competition, college students are faced with higher standards for human resource qualities. Moreover, entrepreneurship education for college students is confronted with numerous challenges.

Based on the aforementioned, this article attempts to explore the potential of ChatGPT to empower college students' innovation and entrepreneurship education in China by addressing the challenges faced by this domain. The paper is structured as follows: The first part introduces the origin and educational characteristics of ChatGPT; the second part analyzes the key areas of focus for applying ChatGPT in entrepreneurship education for college students; the third part discusses the potential threats posed by ChatGPT in this field; the fourth part proposes governance suggestions for using ChatGPT in entrepreneurship education for college students; and the final part presents the conclusion of this paper.

2. The origin and educational characteristics of ChatGPT

2.1. The origin of ChatGPT

OpenAI is an artificial intelligence research company founded in 2015 in San Francisco, USA by Sam Altman and others. Its largest shareholder is Microsoft, and Elon Musk is also a founding member. In 2016, OpenAI released their first open project, OpenAI Gym Beta, a tool for developing and comparing different reinforcement learning algorithms. In 2017, OpenAI open-sourced OpenAI Baselines, a tool that provides practical implementations for reinforcement learning algorithms, which helps users improve their research efficiency. In June 2018, OpenAI announced the first generation of GPT, which for the first time combined the self-attention mechanism transformer model with unsupervised pre-training. It had 117 million parameters and was a pioneering exploration of large language models (LLM). In February 2019, the GPT-2 was released, which was the result of scaling up GPT and had 1.5 billion parameters, trained on more than 8 million web pages. In May 2020, OpenAI launched GPT-3, which added features such as reinforcement learning from human feedback (RLHF), code training, instruction tuning, and more. Better architecture, larger scale, and greater data volume established its dominant position. In its subsequent development, GPT-3.5 introduced three fine-tuning training methods, namely Supervised Fine-Tuning (SFT), Feedback Made Easy (FeedME), and PPO-based reinforcement learning from human feedback. On November 30, 2020, the ChatGPT product, adjusted by GPT-3.5, was launched.

ChatGPT is essentially a generative conversational AI model that uses artificial intelligence technology to generate and output text, code, images, and other content, with powerful capabilities for information retrieval, natural language processing, and text generation. ChatGPT did not emerge out of nowhere, but rather, it is the result of a lot of technical accumulation that began with the GPT-1.0 version and even earlier algorithm tools. Each version iteration is the result of years of in-depth research on related products.

2.2. The educational characteristics of ChatGPT

Derived from the stages of machine learning and deep learning, and now in the phase of general

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models, ChatGPT has the ability to understand and create. Unlike traditional robots, ChatGPT can not only recognize and analyze input data such as text and images, but can also further understand and recreate, truly realizing the value of creation. [4] ChatGPT under the large language model has the potential to bring transformation to education with its powerful technology and multiple functions, and has been proven successful in solving complex problems in various fields, including education, this includes college students' innovation and entrepreneurship education. [5] Firstly, from the perspective of teaching management, ChatGPT technology provides technical support for educational institutions to improve the efficiency of overall teaching management. For example, functions such as automatic student attendance management, automatic task allocation and homework collection, automatic grading, etc. can help educational institutions to manage teaching process more effectively. Secondly, from the perspective of teaching methods, ChatGPT technology can help improve the teaching methods of innovation and entrepreneurship education for college students. For example, teachers can use ChatGPT to attract students' attention, make students more focused in class, and implement more effective control over student behavior and teaching process. Thirdly, from the perspective of learning efficiency, ChatGPT technology enables the learning process to no longer be restricted to the classroom and textbooks, while providing more supplementary and explanatory knowledge, thereby improving the learning efficiency of innovation and entrepreneurship courses for college students. Fourthly, from the perspective of learning experience, ChatGPT technology provides more rich learning content and learning forms for the learning of innovation and entrepreneurship courses for college students, mobilizes their interest in learning these courses, helps them complete tasks more efficiently, and provides more interactive processes, thereby enhancing the learning experience of innovation and entrepreneurship courses for college students.

3. Empowerment of ChatGPT on college students' innovation and entrepreneurship education

3.1. Empowerment of ChatGPT on college students in the field of innovation and entrepreneurship education

3.1.1. Accuracy

Although learners of innovation and entrepreneurship education can access massive educational resources online, the large amount of data makes it difficult for learners to collect the information they need accurately. They are often disturbed by some useless information, which leads to "information overload". Therefore, they urgently need a tool that can help them quickly find information that truly meets their requirements. ChatGPT can understand the user's intention through conversation, and judge the learner's preference based on earlier conversations, filtering out unnecessary information, such as advertisements that often pop up when using search engines like Baidu, thus improving the effectiveness of recommending innovation and entrepreneurship education resources for colleges and universities.

3.1.2. Personalization

In the 21st century, the number of Chinese university students has begun to increase on a large scale. Although the huge student base provides sufficient talent pool for innovation and entrepreneurship education, the fixed classroom teaching paradigm and the fair but lack of innovative evaluation system make the training programs for innovation and entrepreneurship education tend to be unified. ChatGPT has the ability to fine-tune specific tasks, so introducing ChatGPT can generate personalized teaching content for different groups and individuals based on the specific learning needs and innovation abilities of innovation and entrepreneurship education learners, to meet the personalized task requirements of learners. Moreover, ChatGPT can continuously improve and update the data with the increase of training data, so the personalized learning process will become more accurate over time. [6]

3.1.3. Diversity

Diversity is essential for the learning activities of innovation and entrepreneurship education. ChatGPT is capable of supporting learners in diverse learning activities. Taking the China International "Internet+" College Students' Innovation and Entrepreneurship Competition as an example, when university students plan their competition themes, they need to conduct extensive information retrieval to find innovative themes that cater to social development trends. Learners can ask ChatGPT for help, combined with substantive discussions to broaden their thinking. During the business plan writing stage, ChatGPT has the function of generating writing prompts, generating opening or creative writing prompts as basic materials for learners' business plan writing. During the presentation PPT creation

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stage, ChatGPT can be used as a builder for images and frameworks, generating various styles of images and frameworks according to learners' instructions to meet their creative needs.

3.1.4. Exploratory

Research has found that there are many problems in Chinese university students' innovation and entrepreneurship education, including insufficient enthusiasm among learners and unclear understanding and cognition of innovation and entrepreneurship. [7] Learners can autonomously regulate the learning activities and process using ChatGPT according to their preferences. The high operability and developmental capability of ChatGPT can stimulate learners' curiosity and create multiple learning scenarios, helping learners to cognize and understand the core of innovation and entrepreneurship from different perspectives. Human-machine interaction enhances learners' initiative in knowledge acquisition. Therefore, the enthusiasm of learners at different stages of innovation and entrepreneurship education can be improved, and autonomous exploration of innovation and entrepreneurship can efficiently cultivate learners' innovative consciousness and abilities.

3.2. Empowerment of ChatGPT on teachers in the field of innovation and entrepreneurship education

3.2.1. High efficiency

At the teaching level of innovation and entrepreneurship education, ChatGPT can effectively improve the efficiency of teachers' teaching preparations and research activities. Firstly, in terms of establishing teaching objectives, using machine learning algorithms, ChatGPT can identify factors that may cause negative effects and determine the expected outcomes of the course, so as to assist the establishment of teaching objectives. [8] Secondly, for the design of teaching content, ChatGPT can identify the relevant information related to the innovation and entrepreneurship subject area through input, generate and output the following text for the teacher's curriculum outline writing. Finally, during the teaching process, ChatGPT can intelligently assist the teacher to provide customized guidance for students based on their learning status, ability level and learning style, and provide feedback on their complex tasks by analyzing various data during the interaction process. [9] With ChatGPT's support, time spent by the teacher on preparation, interaction and feedback is saved, allowing the teacher to invest more time in creative activities, greatly improving teaching efficiency.

3.2.2. Role transformation

The teaching mode in the past presented a scenario where the teacher was almost in charge of the progress and direction of the classroom, and students were often in a passive receiving state. This could easily lead to problems that undermine students' learning enthusiasm and hinder the development of their innovation awareness and ability, ultimately resulting in poor teaching outcomes in innovation and entrepreneurship education. As a conversational AI, ChatGPT drives the transformation of the traditional role of teachers in the field of innovation and entrepreneurship education, allowing teachers to play more supportive and monitoring roles in the process of students independently using AI for learning, freeing teachers from traditional classroom activities.

4. Potential threats faced by the application of ChatGPT in college students' innovation and entrepreneurship education

4.1. Integrity issue

In the field of innovation and entrepreneurship education, although ChatGPT can assist students and teachers in carrying out learning and teaching activities, there are also some potential problems. ChatGPT has been proven to be able to generate human-like text, which provides students with the opportunity to use ChatGPT as a cheating tool for learning. Students may use the text generated by ChatGPT instead of submitting their own assignments, getting scores that do not match their actual level, leading to serious integrity issues. Moreover, this outcome also misleads teachers' subsequent teaching tasks based on students' performance, leading to a vicious cycle. In addition, the writing of papers is also affected by the impact of ChatGPT. The use of papers generated by ChatGPT bypasses most plagiarism detectors, challenging academic integrity. [10]

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4.2. Fairness issue

Some scholars have raised questions about the algorithmic fairness issue of large language models, stating that the algorithms have been proven to carry potential risks of discrimination and bias. [11] Large language models represented by ChatGPT are influenced by social and cultural biases in the training data, leading to systemic inaccuracies or stereotyping in the generated output results. When the training data is biased towards a particular group, it may lead to unfair discrimination against different groups. Learners in innovation and entrepreneurship education have a higher frequency of exposure to data than other majors, and their sensitivity to data is often higher. Therefore, the probability of being affected by the algorithmic fairness issue of ChatGPT is also higher. In addition, ChatGPT has launched a fee-based business model for subsequent upgraded products, which creates fairness issues for users who face funding limitations. Once they cannot afford the fees, they will miss out on more opportunities.

4.3. Communication issue

The teaching process of any discipline cannot be separated from the interaction and communication between people, and this is especially true in innovation and entrepreneurship education. Some confusions can be resolved through interaction and communication, and some innovative ideas can be obtained from this process. If learners simply focus on communicating with ChatGPT and reduce or ignore necessary face-to-face interpersonal communication and communication with teachers and classmates, it is not conducive to improving their communication skills. The lack of real offline communication activities for learners can easily lead to personality deficiencies, which is a more serious problem than the decline in learning ability. In addition, a small amount of spoken expression cannot accurately indicate the intention and psychological activities of students, resulting in poor teaching outcomes in innovation and entrepreneurship education.

4.4. Development issue

Frequent use of ChatGPT can lead to a dependency mentality among learners in innovation and entrepreneurship education, similar to the current phenomenon of people's dependence on electronics such as mobile phones in daily life, which makes learners accustomed to the "data feeding" mode. The easy and low-cost way of obtaining information will amplify learners' laziness and weaken their interest in conducting independent investigations and coming up with original conclusions or innovative solutions. Meanwhile, hindering the development of critical thinking should also be a concern for the deep application of ChatGPT. The solidification of thinking and the weakening of action ability are fatal injuries for learners of innovation and entrepreneurship education who need to possess strong critical thinking skills and practical abilities.

5. Governance recommendations for the application of ChatGPT in innovation and entrepreneurship education for college students

5.1. College students

College students are the main force of innovation and entrepreneurship education, as well as one of the most promising groups for innovation and entrepreneurship. They are also the driving force behind mass entrepreneurship and innovation. To prevent the risks brought by the application of ChatGPT to innovation and entrepreneurship education, college students should establish a strong sense of ownership and consciously guard against risks. First, improve digital literacy and master methods to use intelligent technology to improve innovation. Second, improve their own moral character and firmly resist unethical behavior such as using ChatGPT for idea plagiarism. Third, actively participate in offline substantial activities led by innovation and entrepreneurship education to prevent addiction to the online world. Fourth, pay attention to the cultivation of critical thinking and innovation ability, read widely and practice hands-on. After conducting self-derivation and testing, adopt the suggestions of ChatGPT.

5.2. College teachers

To prevent the risk of students relying too much on big language models like ChatGPT to generate

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innovative and entrepreneurial texts, teachers should change the evaluation methods based on the teaching environment. At the same time, teachers should avoid formulaic assignments and exams. Teachers should actively learn and master the knowledge and application of intelligent technologies such as ChatGPT, and integrate intelligent tools such as ChatGPT into innovation and entrepreneurship teaching. At the same time, pay attention to observing students' learning and physical and mental health, establish good communication channels between teachers and students, and play a guiding role in the interaction and integration between student innovation and entrepreneurship education and ChatGPT.

5.3. School administrators

School administrators are the gatekeepers of whether students and machines can cooperate for the common good and fully leverage each other's advantages and effectiveness. They should adhere to the basic position of education-oriented. Returning to the origin of education, respecting the basic laws of talent cultivation and growth, combining with the school's characteristic educational philosophy, and leading by example to answer the question of "what kind of people to cultivate" in the era. As the main body of innovation and entrepreneurship education, school administrators have certain rights and regulations. On the one hand, school administrators should attach importance to cultivating students' innovative ability, not just traditional academic abilities. They should actively organize relevant lectures, develop related courses to provide learning opportunities for students, and regularly investigate the application of ChatGPT, and organize professional teams for evaluation. On the other hand, they should not evade responsibility and take up the responsibility for cultivating students' innovation and entrepreneurship under the application scenarios of ChatGPT. They should explore and train the teaching team targeting the pain points of innovation and entrepreneurship education, and play a leading role in students' future development.

5.4. Government departments

The integration and development of "AI + Education" has brought opportunities to innovation and entrepreneurship education, but also posed a series of challenges to the governance of education by government departments. Issues such as intellectual property ownership, data privacy and security, and academic misconduct have sparked widespread ethical discussions on the use of ChatGPT in education by various sectors of society. Government departments should conduct forward-looking thinking and explore effective responses to new developments, new challenges, and ethical issues in the fields of innovation and entrepreneurship education and intelligent technology. On the one hand, they should improve government regulatory responsibilities and legal regulations, and standardize the development and use of educational robots in the market. On the other hand, they should increase funding support for innovation and entrepreneurship education and strengthen the construction of AI service platforms for college students' innovation and entrepreneurship.

6. Conclusions

In the era of digital economic development, relying on modern information networks and applying information and communication technologies has become a norm, and intelligent technologies have been integrated into all aspects of social life. Therefore, the trend of deep integration and development of AI technology and innovation and entrepreneurship education is irreversible. The popularity of ChatGPT worldwide is not accidental, and all sectors of society should face the dual nature of ChatGPT in application in the field of innovation and entrepreneurship education, and seize opportunities while not ignoring potential risks. As various participating entities in innovation and entrepreneurship education, including students, teachers, school administrators, and government departments, should be well-prepared to respond to the impact of ChatGPT. Social and economic development and innovation and entrepreneurship education require high-quality talents with strong innovation and entrepreneurship abilities and critical thinking. The practical application of ChatGPT technology provides more possibilities for the development of college students. Ethical and effective application of AI technology such as ChatGPT is of great significance and far-reaching impact for promoting the successful transformation of college student innovation and entrepreneurship education, responding to the national innovation-driven development strategy, and cultivating innovative talents for the country.

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References

[1] Prasad K., Kumar V. Artificial intelligence-driven drug repurposing and structural biology for SARS-CoV-2 [J].Current Research in Pharmacology and Drug Discovery 2021; 2(2):100042.
[2] Sallam M. ChatGPT Utility in Healthcare Education, Research, and Practice: Systematic Review on the Promising Perspectives and Valid Concerns [J].Healthcare 2023; 11(6):887-887.
[3] Wang W., Qiu D., Chen X., Yu Z. An empirical study on the evaluation system of innovation and entrepreneurship education in applied universities[J].Computer Applications in Engineering Education 2022; 31(1):100-116.
[4] Humphry T., Fuller L.A. Potential ChatGPT Use in Undergraduate Chemistry Laboratories[J]. Journal of Chemical Education 2023; 100(4):1434-1436.
[5] Farrokhnia M., Banihashem K.S., Noroozi O., Wals A. A SWOT analysis of ChatGPT: Implications for educational practice and research[J].Innovations in Education and Teaching International 2023.
[6] Rudolph J., Tan S., Tan S. ChatGPT: Bullshit spewer or the end of traditional assessments in higher education?[J].Journal of Applied Learning & Teaching 2023;6(1).
[7] Zhang W. Quality Improvement of College Students' Innovation and Entrepreneurship Education Based on Big Data Analysis under the Background of Cloud Computing [J].Scientific Programming 2022.
[8] Somasundaram M., Latha P., Pandian S. Curriculum Design Using Artificial Intelligence (AI) Back Propagation Method[J].Procedia Computer Science 2020;172(C):134-138.
[9] Zhai X. ChatGPT user experience: Implications for education [J].SSRN Electronic Journal; 2022.
[10] Cooli C. Chatbots in Education and Research: A Critical Examination of Ethical Implications and Solutions [J].Sustainability 2023; 15(7):5614.
[11] Joseph M., Kearns J.M., Morgenstern J., Neel S., Roth A. Rawlsian Fairness for Machine Learning [J]. CoRR 2016.