

Original Paper

Investigation on the Current Situation and Ethical Reflection of ChatGPT Application in Education under the Background of Digitalization

Guohang Sun^{1*}, Bingqi Li¹ & Guohang Sun¹

¹ Hengxing University, Qingdao, China

* Corresponding author

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Abstract

With the rapid advancement of the digital globalization process, the iterative renewal of educational technology has promoted the reform of teaching tools and the renewal of educational concepts in the field of education. Advanced AI technologies such as ChatGPT play a key role in this process, bringing unprecedented innovation and opportunities to educational practice with their powerful natural language processing capabilities and deep learning techniques. At the same time, the wide application of these technologies has also triggered a series of deep ethical considerations. Therefore, it is particularly important and urgent to conduct an in-depth investigation into the application status of advanced technologies such as ChatGPT in the field of education and to think calmly about the ethical issues involved.

Keywords

Digital background, ChatGPT, Educational application, Ethical thinking

1. Introduction

With the rapid development of natural language processing, artificial intelligence and machine technology, the wave of digitalization has swept the world, and has had a profound impact on all walks of life. Among them, the impact and change in the field of education is particularly obvious. In recent years, the application of artificial intelligence technology such as ChatGPT in education has been gradually popularized, which has brought profound change to the traditional education model. However, the educational innovation and efficiency gains it has brought have been matched by a series of discussions and questions about its ethics, privacy and security.

ChatGPT is a name that stands for an artificial intelligence technology. ChatGPT is a language model developed by OpenAI for natural language processing and text generation tasks. This model can understand a large number of natural language inputs and produce outputs that fit the context. ChatGPT is widely used in chatbots, intelligent customer service, article abstract and other fields. Where "Chat" stands for chat or conversation, and "GPT" stands for generative pre-trained transformer, an algorithm that uses deep neural networks for natural language processing tasks.

ChatGPT greatly simplifies research activities that would otherwise require extensive scientific training, such as literature search, research design, data processing, and results analysis, providing front-line teachers with more opportunities to participate in educational research (Wang, 2023). The development trend of ChatGPT application in the field of education is mainly reflected in the popularization of personalized learning assistants, the improvement of intelligent teaching assistance systems, the innovation and development of online education platforms, the intelligence of educational assessment and feedback, and the integration and application of interdisciplinary fields.

The development trend of ChatGPT application in the field of education is mainly reflected in the popularization of personalized learning assistants, the improvement of intelligent teaching assistance systems, the innovation and development of online education platforms, the intelligence of educational assessment and feedback, and the integration and application of interdisciplinary fields. These trends are expected to drive innovation in education and improve teaching outcomes and learning experiences. However, we should also note that ChatGPT's application in the field of education still faces some challenges and issues, such as data security and privacy protection, technical feasibility and educational equity. Therefore, in future research, we need to further explore how to overcome these challenges and problems to better realize the potential of ChatGPT in the field of education. At the same time, we also need to pay attention to the combination of ChatGPT with other advanced technologies, such as virtual reality, augmented reality, etc., in order to provide more possibilities and options for innovative development in the field of education.

2. Research Questions and Research Hypotheses

2.1 Research Problem

2.1.1 What is the Current Status of ChatGPT Applications in Education in the Context of Digitalization

This question aims to reveal the full picture of the application of ChatGPT in the field of education from multiple dimensions, including but not limited to the application scope, application depth, application effect and challenges faced. An in-depth exploration of this issue can provide us with a comprehensive and systematic perspective to better understand the role and impact of ChatGPT in the field of education.

2.1.2 What are the Ethical Issues of ChatGPT in Its Application in Education

At the same time, with the wide application of ChatGPT in the field of education, the ethical problems caused by ChatGPT have become increasingly prominent. Therefore, this study will further explore:

What ethical issues exist in the application of ChatGPT in the field of education? This question aims to dig deeper into the ethical dilemmas and ethical challenges involved in ChatGPT in educational applications, such as data privacy, algorithmic fairness, and the role of artificial intelligence versus human teachers. Through the study of these problems, we can trigger in-depth reflection on the application of ChatGPT in education, and promote the establishment and improvement of relevant ethical norms.

2.2 Research Hypothesis

2.2.1 The Deep Application of ChatGPT Has Exposed the Challenges and Drawbacks

Under the background of the digital age, ChatGPT has achieved remarkable results in the field of education, including but not limited to the improvement of assisted teaching, personalized learning resource provision and educational evaluation. However, with the deepening of the application, there are also some obvious challenges and problems, such as data privacy breaches, content authenticity is difficult to guarantee, and over-reliance on technology. This study will verify this hypothesis through empirical investigation, and provide a solid foundation for subsequent related research.

2.2.2 The Ethical Issues Raised by ChatGPT Cannot Be Ignored

In practical applications in the field of education, the ethical issues raised by ChatGPT cannot be ignored. These issues can range from information security and intellectual property to the potential impact on students' values. This study assumes that these ethical issues not only exist, but have reached a point where they must be confronted and addressed. Through in-depth research and disclosure of these issues, this study is expected to promote the educational and technical circles to conduct more in-depth discussions and norms on the ethical use of advanced technologies such as ChatGPT.

These two research hypotheses are independent and interrelated, which together constitute the basic framework of this study. Through the verification and discussion of these two hypotheses, we can have a deeper understanding of the status quo and challenges of ChatGPT application in the field of education, reveal the existing ethical issues and their impact more comprehensively, and provide strong support and guidance for subsequent research and practice. At the same time, these two hypotheses also provide a clear direction and goal for the method and path of this research.

3. An Analysis of the Ethical Issues of ChatGPT Application in the Field of Education

3.1 Ethical Conflicts in Personalized Learning Algorithms

In the digital age, although there is no real artificial intelligence yet, some technologies like ChatGPT, which focus on specific functions, have been widely used in teaching. In this approach, the algorithm is the most important, and the algorithm is used to express the answer to the problem to the computer. Especially in recent years, with the rise and development of deep learning methods, ChatGPT breaks the limitations of previous research and provides a new way of thinking for teaching. However, the "algorithm black box" is a phenomenon that is difficult to break through because of its own complexity and the business strategy of technology companies. The traditional calculation method

based on big data is difficult to guarantee the neutrality and objectivity of data, and has a series of negative effects due to its own subjective preferences.

3.1.1 The Opacity of the Algorithm Ignores the Human Right to Know

In recent years, as concerns about the ethics of artificial intelligence have increased, it has been suggested that algorithms should disclose their output principles to ensure users' right to know. However, this requirement faces challenges in practice. Disclosing how algorithms work can increase the risk that a technology company's core algorithms will become known to competitors. At the same time, for the general public, even if they understand the operation principle of the algorithm, they may not be able to understand the whole process, and may not be deeply related to privacy protection. Nevertheless, it still makes sense to remove the "black box" of personalized learning recommendation algorithms. It can promote technological innovation and service innovation in the field of education, and promote the overall improvement of the application of artificial intelligence in education. At the same time, disclosing the operating principle of algorithms will also help break the existing technological monopoly and promote fair competition. In general, it is debatable whether the results of using unexplained individualized learning recommendation methods to process large-scale educational big data are reasonable and can be used to guide individual development. In addition, there are certain uncertainties in privacy protection, informed consent and information security. Therefore, as technology such as ChatGPT is used more in teaching, the ethical issues it contains are worth pondering and discussing.

3.1.2 The Tension between Personalized Learning Recommendation and Human Choice

With the explosion of information, students are faced with the problem of how to choose among the massive amount of information. Recommendation algorithms help students simplify the process of information selection by providing personalized learning recommendations. However, this convenience can also lead to students getting stuck in an "information cocoon." Information cocoon refers to the phenomenon of information bias caused by excessive reliance on personalized recommendation in the process of information selection. This phenomenon can trap students in a self-reinforcing information loop that limits their exposure to and ability to understand different perspectives and knowledge.

In the field of education, the formation of information cocoon may have adverse effects on students' comprehensive quality and critical thinking ability. As a result of over-reliance on personalized recommendations, students may lack understanding and appreciation of diverse perspectives and knowledge, thus limiting the breadth and depth of their thinking. In addition, the information cocoon may exacerbate educational inequalities. Since recommendation algorithms often make predictions and recommendations based on students' historical data and current performance, this can lead to further marginalization of some disadvantaged students. Therefore, in the context of digital education, we need to think ethically about the personalized learning recommendation of ChatGPT and other technologies. In the pursuit of personalized learning, we should also pay attention to students' choice and the risk of information cocoon. In order to balance the tension between personalized recommendation and human

choice, we need to take a series of measures, such as improving the transparency and interpretability of recommendation algorithms, increasing the presentation of diverse viewpoints and knowledge, and encouraging students to actively explore and learn.

3.2 Ethical Challenges Arising from the "Technology Gap" in Education

The application of advanced technologies such as ChatGPT in the field of education has both demonstrated its potential as a media technology and teaching aid, and revealed the resulting "technology gap" problem. This gap is not only due to differences in infrastructure, technical knowledge and skills, but also related to personal information preferences, usage habits and other factors. This disparity further exacerbates inequalities in education.

3.2.1 The "Technology Divide" Deepens Educational Inequality

In the context of digitalization, the application of technologies such as ChatGPT has improved access to educational resources to some extent, but it has also exposed new inequalities. Similar to the traditional "digital divide," this "technology divide" is also reflected in terms of equipment conditions, technology reserves, content preferences, and usage motivations.

The adoption of technologies such as ChatGPT further exacerbates this inequality. On the one hand, these technologies usually require high equipment configurations and network conditions to fully exploit their advantages; On the other hand, their differences in content preferences and usage motivations have also led to differentiation among different student groups. For example, some special-purpose educational applications may only be designed for a specific group to the exclusion of other groups. This exclusivity applies not only to hardware devices, but also to software content and services. In order to alleviate this inequality, we need to take a series of measures to narrow the "technology gap", including strengthening infrastructure, increasing technology penetration, and optimizing educational content and services. At the same time, we also need to pay attention to the educational needs of special groups and ensure that they can equally enjoy the convenience and progress brought by technology.

3.2.2 The ChatGPT Application Has Intensified the Trend of Tool Rationalization

In the digital age, the introduction of advanced technologies such as ChatGPT has brought new changes and expectations to the field of education. These technologies provide a lot of convenience for teaching, so that educators can carry out education activities more efficiently. However, as educators become increasingly dependent on technologies such as ChatGPT, their sense of subjectivity weakens, which intensifies the trend towards tool rationalization. Tool rationalization means that when people pursue goals and solve problems, they overemphasize the effectiveness and efficiency of means, while ignoring the value and significance of the end itself. In the field of education, this trend shows that educators rely too much on the data and analysis results provided by technology such as ChatGPT, and neglect the comprehensive understanding and humanistic care of students.

4. Discussion

In this study, through in-depth investigation and analysis of the status quo of ChatGPT application in the field of education under the background of digitalization, the multi-faceted impact and existing ethical problems of ChatGPT in practical application are revealed. The study found that the widespread use of technologies such as ChatGPT in education has brought about significant changes in teaching practices, while also raising deep ethical concerns about personalized learning, the technology divide, data privacy, and more. In response to these challenges and problems, this study puts forward a series of concrete suggestions and countermeasures.

4.1 Emphasis on Transparency and Explainability

To ensure equity in education and reduce the impact of the technological divide, the algorithms for these technologies need to be transparent and easy to understand. In other words, technology providers have an obligation to explain in detail to teachers and students how algorithms work and how they create corresponding outputs based on input information (Lu, Yu, Chen et al., 2023). This approach not only increases users' confidence in the technology, but also helps them fully understand the limitations and potential slopes of the technology.

4.2 Balance Personalized Learning with Student Choice

While personalized learning recommendation algorithms can provide students with customized learning experiences, over-personalization can result in a narrow range of information that students are exposed to. To avoid this, education systems must intelligently design a balancing mechanism that allows students to enjoy the convenience of personalized learning while being free to explore a wide range of knowledge beyond what the algorithm suggests (Zhong, Shang, Wang et al., 2023). This mechanism can be achieved by providing different learning resources and path choices, or by giving students greater autonomy in choosing courses. At the same time, the role of teachers can not be ignored, they should actively guide students to develop various interests and skills, not just use algorithms to recommend. In this way, students receive precise instruction through personalized learning, while maintaining their curiosity and desire to explore the world (Jiao, 2023).

4.3 Strengthen Data Privacy and Security Protection

In the field of education, technologies such as ChatGPT are being used more and more widely, but they are also leading to serious issues regarding data privacy and security. Strict compliance with relevant data protection and security rules is particularly important to address these challenges (Zhou & Li, 2023). In particular, the protection of students' personal and learning data is of Paramount importance. They should be kept properly and used only for educational purposes. In addition, there is an urgent need to ensure the accuracy and integrity of data and prevent misuse or unauthorized disclosure. Such a mechanism can better protect students' data rights while promoting the healthy development of educational technology.

4.4 Ongoing Attention to Ethical Issues and Adaptation

In view of this, sustained attention to these issues has become particularly important. In order to avoid

potential risks and conflicts, it is necessary to make flexible adjustments according to the actual situation. This includes regularly reviewing and updating ethical guidelines and policies for the use of technology to ensure that they are consistently consistent with the core values of education. At the same time, it is important to establish effective monitoring and feedback mechanisms that can detect deviations in the application of technology in a timely manner and provide valuable suggestions for improvement, thus ensuring that the technology always adheres to ethical principles, while promoting the development of education and strongly supporting the overall development of students.

4.5 Promote Technology Access and Inclusion

It has become an urgent task to close the "technology gap" in education, ensure that all students benefit equally from advanced technologies, and promote access and inclusion of technologies such as ChatGPT. This will require not only strengthening infrastructure and increasing technological penetration by allowing more districts and schools to access and use these technologies, but also paying special attention to the needs of less economically developed areas and special groups. Provide additional support and resources to these regions and groups to ensure that they are not excluded from the technology dividend due to economic conditions or other constraints. At the same time, through extensive education and advertising, so that teachers and students can better understand and use these technologies and promote their popularization and application. These actions help create a more equitable and inclusive educational environment where every student can enjoy the comfort and advancement of technology.

4.6 Establish Multi-party Participation and Cooperation Mechanisms

In the field of education, it is particularly important to establish a multilateral mechanism for participation and cooperation in the deployment of advanced technologies such as ChatGPT to ensure that their implementation is in line with the basic philosophy and objectives of education. This mechanism should include stakeholders such as teachers, students, parents, technology providers and policy makers. Through their joint participation and cooperation, they can not only ensure the rational application of technology, but also promote the development of technology in line with the general direction of education. In addition, the cooperation mechanism will also have a keen understanding of the technology implementation process and be able to identify and address potential problems and challenges in a timely manner, thus ensuring the continuous development of technology in the field of education.

4.7 Encourage Critical Thinking and Information Literacy Education

In the digital age, teachers have an important mission to encourage students to develop critical thinking and information skills in order to effectively address the dangers associated with information cocoons and radically improve the overall quality of students. In this process, it is crucial to teach students ways to identify and evaluate the sources and quality of information, enabling them to sift through a wide range of information for what is true and valuable. At the same time, tutoring students can understand and analyze different perspectives and knowledge, helping them to develop diverse thinking and

engagement. In addition, teaching students how to use and manage information effectively is an important skill for them to adapt to future learning and life challenges. Through these educational measures, students gradually develop into digital age citizens with critical perspectives and high levels of information skills.

The recommendations aim to increase the transparency and interpretability of the use of technology, ensure fairness and inclusion in educational practices, protect students' data privacy and security, promote access to technology and multi-stakeholder collaboration, and develop students' critical thinking and information literacy. These findings and recommendations have important reference value for educational practitioners and policy makers. They can help stakeholders gain a more comprehensive understanding of the current status and challenges of the application of technologies such as ChatGPT in education to make more informed and responsible decisions.

In addition, this study also provides useful enlightenment and direction for the follow-up research, which is helpful to promote the healthy development of technology and the improvement of ethical norms in the field of education. To sum up, this study has important theoretical and practical significance for the investigation of the current situation and ethical consideration of ChatGPT application in the field of education under the background of digitalization. By revealing the current situation, analyzing problems and proposing countermeasures, this study provides useful reference and guidance for the application of technology and ethical norms in the field of education.

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