English Language Teaching and Linguistics Studies
ISSN 2640-9836 (Print) ISSN 2640-9844 (Online)
Vol. 6, No. 3, 2024
www.scholink.org/ojs/index.php/eltls

Original Paper

Educational Applications of ChatGPT: Ethical Challenges and Countermeasures

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Fund Project

Supported by the "Graduate Academic Research Project of Beijing International Studies University"

Received: March 29, 2024 Accepted: May 13, 2024 Online Published: May 23, 2024

doi:10.22158/eltls.v6n3p100 URL: http://dx.doi.org/10.22158/eltls.v6n3p100

Abstract

To mitigate the ethical risks of ChatGPT in educational applications and fully leverage the advantages of AI-enabled education, this study draws on the principles of fairness and justice theory, ethics of care theory, social contract theory, consequentialism, and virtue ethics in ethics to explore the ethical challenges of ChatGPT's educational applications and propose corresponding strategies. The research reveals that the ethical issues in the educational use of ChatGPT include algorithmic bias and unfairness in the domain of techno-ethics, lack of algorithmic transparency and interpretability, and issues of technical reliability and misleading information. In the context of academic ethics, concerns arise regarding the legitimacy of ChatGPT's participation as an academic researcher, the potential for academic plagiarism and misconduct resulting from ChatGPT-generated content, and the limited value of the generated content itself. In terms of educational ethics, challenges encompass issues of educational fairness and equal opportunities, the potential alienation of teacher-student relationships, and the need to strike a balance between educational goals and personalized instruction. Therefore, addressing these ethical challenges and ensuring the fulfillment of its true purpose require approaches that encompass legal regulations and moral constraints, fostering awareness among individuals involved, and defending the essence of education while fostering innovation.

Keywords

ChatGPT, Ethical challenges, Educational application, Education Empowerment

1. Introduction

On November 30th, 2022, OpenAI, the artificial intelligence research laboratory, introduced a new chatbot model called ChatGPT. This novel generative natural language processing tool has garnered significant attention and discussion from various sectors of society, including education and academia. On one hand, ChatGPT holds the potential to drive digital transformation in education, improve educational quality, promote personalized learning, enhance accessibility to educational resources, and increase flexibility and engagement in education (Euchner, 2023; Jiao et al., 2023; Hu et al., 2023). On the other hand, concerns have been raised about the potential ethical risks associated with the application of ChatGPT, encompassing issues in technology ethics, academic ethics, and educational ethics, thus posing significant challenges to the ongoing technological reform in artificial intelligence (Dowling et al., 2023; Zhong, 2023). Existing research has indicated that the existing benchmark of language models, represented by ChatGPT, fails to address the numerous ethical issues it inherently contains, which may manifest as various social biases and improper use, leading to irresponsible ethical risks and societal consequences.

Addressing the risks and ethical governance in the context of educational digital transformation driven by artificial intelligence is of paramount importance. On one hand, the field of ethics continues to evolve as new ethical issues emerge. The ethical challenges posed by ChatGPT in the field of education involve not only educational ethics but also encompass issues in technology ethics, academic ethics, and other relevant domains. These emerging ethical issues at the intersection of multiple fields warrant in-depth theoretical research, which can further contribute to the advancement and innovation of ethical theories. On the other hand, given the initial application of ChatGPT in the field of education, its shortcomings in technology ethics, academic ethics, and educational ethics have become apparent. These shortcomings include weak risk awareness leading to data breaches and misuse, ingrained risk cognition resulting in machine algorithm discrimination and biases, shifting risk focus leading to the weakening and disruption of teacher-student relationships, and misjudgment of risks resulting in academic fairness violations and imbalances (Wang et al., 2023). As direct stakeholders, the education industry is already facing multidimensional challenges brought about by the technological transformation of artificial intelligence, encompassing education environment, educational methods, teaching tools, learning approaches, curriculum content, intellectual property, knowledge standards, and particularly the roles, status, and relationships of teaching subjects, namely teachers and students, which may face significant impacts and restructuring due to intelligent robots (Shen, 2023; Xia, 2023; Wang, 2023). Therefore, it is crucial to clarify the ethical challenges in the application of ChatGPT in education and seek viable ethical governance strategies. The proposal of effective response strategies holds profound practical significance in promoting the healthy development of the educational ecosystem in the era of intelligent education.

With the advent of the ChatGPT era, the field of education is poised for a new wave of transformation driven by artificial intelligence. Only through proactive adaptation can the integrity of education be

preserved. This study aims to analyze the dialectical relationship between "education" and "ChatGPT" from an ethical perspective, with the following three research questions in focus:

(1) What are the ethical issues (technological, academic, and educational) associated with the application of ChatGPT in education?

(2) How can the ethical issues arising from the application of ChatGPT in education be addressed?

(3) How can education be empowered under ethical norms in the era of ChatGPT?

2. Literature Review

In this part, the author provides a review of the basic concepts of ethics and the current research status of ChatGPT in educational applications. This lays the theoretical foundation and clarifies the concepts for the subsequent analysis of the ethical challenges of ChatGPT in education and the proposal of corresponding strategies.

2.1 Analysis of Ethical Concepts

The term “ethics” in its broad sense refers to “morality” and in its narrow sense is often used to denote the moral principles of a particular tradition, group, or individual (Audi & Audi, 1995). In China, the term “ethics” first appeared in the Record of Rites - Record of Music. It holds that all sounds originate from the human heart and the music communicates ethics.This signifies the connection between art and social ethics, as the harmonious order and stability demonstrated by the rites and music highlight the role of ethics as social norms. From the interpretations of ethics in both Chinese and Western philosophy, it can be seen that they have reached a consensus regarding the inseparable relationship between ethics and morality, and unless necessary, they do not strictly distinguish between the two in usage. Ethical philosophy, also known as moral philosophy, is a scientific discipline that involves systematic thinking and research on human moral life. It addresses moral issues by defining concepts such as good and evil, right and wrong, virtues and vices, justice and crime. Modern ethical research can be divided into various branches based on different dimensions, such as normative ethics, applied ethics, descriptive ethics, meta-ethics, practical ethics, and comparative ethics. However, the commonly used classification includes meta-ethics, normative ethics, and applied ethics.

The focus of this study is on the ethical challenges of ChatGPT in educational applications, which primarily fall under the domain of applied ethics. Applied ethics examines the practical application of ethical theories in real-life situations. Specific areas of applied ethics include medical ethics, bioethics, business ethics, computer ethics, robotics ethics, and other fields. This study discusses the ethical challenges of ChatGPT in educational applications, which essentially involve the analysis and interpretation of the potential risks posed by the application of artificial intelligence technology in the fields of technology ethics, academic ethics, and educational ethics. When proposing specific strategies to address these challenges, the theoretical basis primarily draws on theories such as the theory of justice, care ethics, social contract theory, consequentialism, and virtue ethics.

The theory of justice as fairness was first proposed by philosopher John Rawls in his work A Theory of

Justice. Rawls, an important thinker in the field of ethics and political philosophy in the 20th century, conducted in-depth research on the concepts of justice and fairness and presented a theoretical framework for justice as fairness. Rawls elaborated on his theory of justice as fairness and emphasized the importance of achieving fairness in society. He put forward two fundamental principles: firstly, each person should have an equal right to basic liberties, and secondly, inequalities in the distribution of resources and opportunities are only justified if they benefit the least advantaged members of society to the greatest extent possible. This theory highlights that inequalities in society should serve the interests of the least advantaged group and advocates for principles of social contract and justice to address the issues of resource allocation and opportunity distribution. The theory prompts us to contemplate how to ensure the fair, equitable, and sustainable application of ChatGPT in education, safeguarding the rights of students and fostering the equitable and just development of education.

The theory of ethical care, proposed by philosopher Carol Gilligan in her work In a Different Voice, emphasizes the role of emotions, concern, and responsibility in interpersonal relationships. It focuses on individual needs, respect, and care, as well as fostering love and interdependence among individuals. As ChatGPT is merely a highly intelligent machine, it may not provide genuine emotional care and interpersonal interaction. Therefore, this theory guides us to reflect on how to compensate for the machine's lack of emotional dimension when applying ChatGPT in educational settings. It emphasizes the importance of attending to students' interpersonal relationships and emotional needs, catering to individual differences and requirements, and fulfilling the moral and caring responsibilities of educators. In practice, we can draw on the principles and values of the theory of ethical care to formulate corresponding policies and norms, ensuring that the educational application of ChatGPT embodies care and responsibility towards students.

The social contract theory, proposed by ethical theorists such as Thomas Hobbes, John Locke, and Jean-Jacques Rousseau, is an ethical theory in social and political philosophy. It posits that the formation of social and political order is based on a mutual agreement or contract reached among individuals. According to the social contract theory, individuals exist in a state of natural freedom and equality. However, due to the challenges of competition, conflict, and uncertainty, individuals voluntarily relinquish some of their freedom and rights in exchange for the maintenance and assurance of social and political order. The social contract theory offers a crucial perspective to consider ethical issues related to artificial intelligence technologies. As an intelligent machine, ChatGPT engages in conversations and interactions with users, involving issues of power, privacy, and responsibility. The social contract theory reminds us that when applying ChatGPT in education, considerations should be given to the rights and autonomy of users, ensuring that the relationship between users and ChatGPT is based on reciprocity and fairness.

The core principle of Ethical Utilitarianism is that the moral value of an action depends on the consequences or outcomes it generates. Utilitarianism focuses on maximizing happiness or utility by evaluating the outcomes of actions to determine their moral worth. The roots of Utilitarianism can be

traced back to British philosophers Jeremy Bentham and John Stuart Mill, who argued that the moral value of an action should be judged based on the greatest happiness it brings to the overall society. Utilitarianism emphasizes the maximization of overall well-being rather than individual satisfaction or happiness. Discussing the ethical issues of ChatGPT from a utilitarian perspective requires considering whether ChatGPT truly maximizes students' learning outcomes and satisfaction when providing educational services and whether it provides better teaching resources and tools for teachers and schools. Utilitarianism can also help weigh the benefits and costs of ChatGPT in the field of education. The negative impacts, such as reduced interpersonal interaction, inhibition of individual creativity, or threats to personal privacy, that accompany the convenience brought by ChatGPT should also be given due consideration.

Ethical Virtue Theory, also known as Virtue Ethics or Virtue-based Ethics, focuses on the influence of an individual's character and moral qualities on moral behavior. This theory emphasizes the cultivation and development of good character and virtues, asserting that genuine moral behavior can be achieved through an individual's moral cultivation and character development. One of the prominent proponents of Virtue Theory is the ancient Greek philosopher Aristotle. Aristotle believed that the roots of moral behavior lie in an individual's character and virtues, rather than solely in the actions themselves. He argued that by cultivating and developing virtues such as courage, honesty, and humility, individuals can reach the highest state of human flourishing and demonstrate excellent character in moral conduct. Ethical Virtue Theory highlights the close connection between ethics and virtues. When discussing the ethical issues of ChatGPT, the focus is primarily on whether the design and application of ChatGPT contribute to the cultivation of individuals' virtues and character, considering its role in education in fostering students' moral literacy and character development, and whether it encourages acts of integrity, respect, and responsibility. Additionally, Virtue Theory emphasizes that an individual's moral judgments and behavior are driven by intrinsic virtues rather than solely by external rules and norms. Therefore, the assessment of ChatGPT in education includes evaluating whether it fosters students' self-discipline, self-reflection, and responsible behavior, and whether it stimulates intrinsic motivation towards moral conduct.

2.2 Ethical Landscape of ChatGPT in Educational Applications

Just as each industrial revolution has brought significant changes in modes of production, every technological advancement is bound to bring about major transformations in the field of education. ChatGPT, utilizing conversational artificial intelligence technology, is a novel natural language processing tool driven by artificial intelligence and is considered one of the products of the fourth technological revolution. This study views ChatGPT as an artificial intelligence and attempts to analyze the ethical dilemmas and challenges of machine intelligence applied to education from the perspective of artificial intelligence ethics.

Following the application of ChatGPT in education, scholars have primarily discussed it from four aspects: (1) the fundamental principles of ChatGPT and its educational implications, (2) the boundaries

of ChatGPT's capabilities, (3) the application value and potential risks of ChatGPT, and (4) ChatGPT in educational applications and talent development. Initially, scholars primarily focused on the potential advantages of ChatGPT in empowering education, emphasizing its promotion of student learning on one hand, such as personalized learning support, automatic assessment and feedback, language learning and practice, and access to resources and information. On the other hand, it highlighted its enhancement of teaching efficiency at the teacher level, including course design and teaching strategies, teaching resources and materials, automatic assessment and grading, instructional assistance and answering, professional development and training (Rudolph et al., 2023). However, when ChatGPT is widely implemented, as proposed by Marcuse, scientific and technological advancements are not value-neutral, and the "technology of logic has turned into the logic of still remaining domination." The convenience of ChatGPT's technology also exposes its drawbacks, such as the lack of authenticity and human emotion, limitations in language and culture, ethical and privacy concerns, lack of interaction and feedback from human teachers, as well as issues of technological reliability and misinformation. Even OpenAI itself acknowledges that as a language model, ChatGPT lacks the ability to understand and consider ethical and legal issues and make judgments based on ethics or laws.

Scholars both domestically and internationally have paid attention to the ethical issues that may arise from the application of ChatGPT in education and have attempted to propose strategies from the perspectives of institutional mechanisms, technological innovation, and ethical norms. For example, Partha (2023) summarized several key aspects of ethical issues in computer science, including data privacy and protection, biases and fairness, transparency and accountability, impacts on employment, emotional manipulation and persuasion, dependence on AI-generated content, autonomy of AI systems, impacts on creative industries, ethical use of AI-generated content, applications of AI in education and training, deep-fake text and misinformation, unequal access to AI technology, intellectual property rights and copyrights, erosion of trust in digital communication, AI in social media and online platforms, cultural and language biases, ethical development of future AI systems, and the digital divide and technological acquisition. Regarding the application of ChatGPT in education, scholars primarily focus on the potential ethical issues in these aspects and propose strategies to minimize the negative impacts of artificial intelligence technology while maximizing its potential for educational empowerment. Chinese scholar Feng (2023), based on the basic dimensions of educational artificial intelligence ethics, interprets the forms of ethical risks of artificial intelligence from the perspectives of subjects, relationships, algorithms, and resources. It points out that the application of ChatGPT in the field of education, as a content generation-based product, brings a series of positive influences, including enhancing students' practical creativity, strengthening students' cognitive initiative, empowering students with the autonomy of choice, and promoting reduced burden and increased efficiency. However, it also raises ethical issues, including the loss of critical thinking due to dependence on artificial intelligence, alienation of teacher-student interaction and emotional absence, algorithmic ethical issues related to knowledge blind spots and information cocoons, and resource

ethics issues of educational inequality and unclear rights and responsibilities. Correspondingly, some governance paths are proposed, including promoting changes in educational concepts to consolidate students' subject position, establishing new forms of teacher-student relationships to enhance the power of emotional communication between teachers and students, constructing a comprehensive system for regulating algorithm ethics to ensure risk governance of ChatGPT's educational application, and promoting the reasonable application of intelligent technology in the field of education.

However, the current discussion on the ethical landscape remains at a macro level, unable to analyze the ethical irrationality of ChatGPT from its ethical roots. Moreover, scholars rarely differentiate these potential ethical challenges into challenges at the levels of technological ethics, academic ethics, and educational ethics. Furthermore, they have not truly discussed these ethical challenges and strategies in the framework of ethics. Therefore, this paper will further discuss the ethical challenges of ChatGPT in educational applications from the perspectives of technological ethics, academic ethics, and educational ethics.

3. Ethical Challenges of ChatGPT in Educational Applications

This study focuses on the general discussion of the ethical challenges of ChatGPT in educational applications and explores its technological ethics, academic ethics, and educational ethics.

3.1 Challenges in Technological Ethics

Technological ethics is an interdisciplinary field that encompasses various domains, including research ethics, engineering ethics, technical ethics, bioethics, environmental ethics, information ethics, and high-tech ethics. Narrowly defined, technological ethics primarily refers to the ethics involved in scientific research and technological exploration, while broadly defined, it also encompasses the application, dissemination, and socio-cultural impacts of technology, extending to the domain of social ethics. To continually address the emerging ethical issues in technological practices, technological ethics should adopt a problem-oriented approach, combining descriptive and normative research to form a comprehensive research procedure, theoretical framework, argumentative model, and system of ethical principles. This process should be an open practice based on empirical and reflective constructions. As an artificial intelligence technology, ChatGPT involves technological ethics when applied in education, including (1) algorithm biases and unfairness, (2) algorithm transparency and interpretability, and (3) technological reliability and misleading issues.

Firstly, algorithm biases may exist in ChatGPT's models and training data due to the subjectivity in data source selection, data processing and annotation processes, and the learning characteristics of the models themselves. The data used to train the ChatGPT models is typically collected from large-scale datasets sourced from the internet. These datasets may reflect various biases and imbalances found on the internet, including social biases, cultural biases, gender biases, and so on (Williamson et al., 2023). For example, when asked about recent news events, ChatGPT may suggest referring to so-called "authoritative" media outlets like CNN and BBC, solidifying the "information cocoon" of the Western

discourse system in the deep integration of ChatGPT with education. If the algorithm model heavily relies on these data sources during the training process, biases and imbalances may be incorporated into the generated content. The ChatGPT model achieves content generation through extensive pre-training and fine-tuning. During pre-training, the model establishes a language model by learning statistical patterns and semantic associations from a large corpus of text data. This approach may lead the model to learn certain social biases and cultural tendencies that are reflected in the generated content. Furthermore, data processing and annotation inevitably involve subjectivity and human factors, potentially introducing individual biases and values. These biases may be learned by the algorithm model and manifested in the generated content. ChatGPT's data training is overseen by OpenAI, raising concerns about potential biases associated with the interests represented by the company. The existence of such biases may result in content generation that is biased or imbalanced, favoring or disfavoring certain groups or viewpoints. Therefore, ensuring fairness and balance in the generated content of ChatGPT, and avoiding the presence of biases, is an important technological ethical challenge.

Secondly, the issue of algorithm transparency and interpretability in ChatGPT is primarily caused by the complexity of deep learning models, data-driven training methods, and the characteristics of black-box models. ChatGPT is a model built on deep learning technology, characterized by multi-layer neural network structures and a large number of parameters, making its working principles and content generation processes complex and difficult to understand. This complexity renders the decision-making and inference processes of the model difficult to comprehend and explain, posing challenges to users and educational practitioners. ChatGPT is a "black-box" model, meaning that the mapping between input and output is not easily observable or understandable (Tuomi, 2018). This characteristic of the model makes it difficult for users to accurately determine how the model makes decisions and generates output. The lack of visibility and comprehensibility regarding the internal workings of the model results in the model's lack of interpretability. This opacity and lack of interpretability may reduce users' trust in ChatGPT and increase confusion and concerns among users and educational practitioners. If users cannot truly understand the operational mechanisms of the tool they are using, it may hinder the establishment of trust between humans and machines, thus limiting large-scale adoption. Therefore, ensuring algorithm transparency and interpretability in ChatGPT, enabling users to understand how the algorithm operates and the basis for content generation, is an important technological ethical issue.

Furthermore, the main reasons for the issues of technological reliability and misleading information in ChatGPT stem from knowledge and information gaps, limitations in contextual understanding, and the influence of data selection and preprocessing. These factors may result in inaccurate, biased, or misleading generated content, providing users with misleading and unreliable information. Despite having extensive pre-training knowledge, ChatGPT does not possess comprehensive knowledge and information (Liu, 2020). For example, research has shown that the model is constrained by the events it was pretrained on and can only provide information up until 2021. In fact, to fulfill the instructions,

ChatGPT may even fabricate information that does not exist (Jena & Goyal, 2023). These responses are primarily based on patterns and correlations in the training data rather than deep understanding or extensive knowledge. This may result in knowledge gaps for ChatGPT in certain domains or specific questions, making it unable to provide accurate and comprehensive information.

3.2 Challenges in Academic Ethics

Academic ethics refers to the fundamental ethical standards that members of the academic community should adhere to, along with the social responsibilities and obligations they must assume in their scholarly activities. It involves rational understanding of these ethical standards through theoretical exploration. The core principles of academic ethics include honesty, transparency, fairness, respect for others' knowledge contributions and rights, compliance with academic norms and legal regulations, and so on. The academic risks arising from the application of ChatGPT in the field of education primarily fall into three categories: (1) the legitimacy of ChatGPT as a participant in academic research, (2) academic plagiarism and unethical behavior resulting from ChatGPT's text generation, and (3) the quality of the generated content by ChatGPT.

Firstly, as ChatGPT has the capability to generate text, it can be used to produce academic papers, research reports, or other scholarly works. This raises discussions about the legitimacy of ChatGPT as a participant in academic research. Some scholars acknowledge the "originality" contribution of machine intelligence represented by ChatGPT in academic research and argue that it can be credited in research outcomes, such as leveraging ChatGPT's efficient text generation capabilities in code generation (Bryson, 2012). However, other scholars explicitly state that AI systems like ChatGPT are merely tools without research abilities or creativity. They argue that ChatGPT should not be considered a collaborator or independent researcher, as it relies on pre-trained models and training data to generate text (Anderson, 2007; Thorp, 2023). In this regard, it is argued that when using text generated by ChatGPT as part of academic research, its source should be clearly indicated, and its contribution and authority should be cautiously evaluated.

Secondly, academic ethics requires researchers to conduct truthful, reliable, and objective research, avoiding exaggeration of research results or data manipulation, and refraining from academic misconduct such as plagiarism and intellectual theft. Researchers should respect the intellectual property and academic achievements of others, adhere to citation norms, and avoid misappropriating others' research findings (Else, 2023). However, when generating text based on pre-training content, ChatGPT does not indicate the sources and has been criticized as blatant knowledge plagiarism by linguist Chomsky. Academic ethics also emphasizes the respect and protection of research subjects and participants, requiring researchers to ensure informed consent, privacy protection, and confidentiality throughout the research process, as well as respecting the rights and dignity of research subjects. However, in the process of using ChatGPT for educational analysis, a significant amount of student information may be collected, and ChatGPT may indiscriminately utilize this information and produce content based on instructions, posing risks of information leakage.

Lastly, in terms of the value of the generated content by ChatGPT itself, due to its reliance on large-scale training data, the generated content may contain a considerable amount of noise, redundancy, or low-quality information. This raises questions about the value and credibility of ChatGPT's generated content. In educational applications, if the content generated by ChatGPT lacks accuracy, depth, and creativity, it may fail to meet students' learning needs and even mislead them.

3.3 Challenges in Educational Ethics

Education is a human development activity. Educational ethics, as the ethical morality in the process of nurturing individuals, is formed and developed through real educational activities and reflects the ethical concepts of certain societies. It is influenced by historical and cultural traditions but primarily shaped by societal expectations of education. Educational ethics provides guidance and a framework for exploring the ethical risks of ChatGPT in educational applications, helping us to consider and address issues related to teacher-student relationships, choice of teaching methods, respect for individual differences, and fairness in resource allocation. In the field of education, ChatGPT faces ethical challenges related to (1) educational fairness and equal opportunities, (2) the transformation of teacher-student relationships, and (3) balancing educational goals with personalized teaching.

Firstly, educational fairness and equal opportunities are important principles in educational ethics aimed at ensuring equal access to education for every student. However, the application of ChatGPT in education may lead to unequal distribution of educational resources and imbalances in opportunities. For students who do not have access to ChatGPT for various reasons, they may be deprived of the educational resources and advantages offered by this technology. This could include a lack of access to technological devices, unstable internet connectivity, or economic constraints. Such circumstances can result in unequal distribution of educational resources, denying some students the learning opportunities associated with using ChatGPT, which in turn can impact their learning outcomes and development. Moreover, considering the differences in students' digital literacy, learning abilities, and self-directed learning capabilities, this imbalance of opportunities may further widen educational inequities and disparities among students.

Secondly, teacher-student relationships are a crucial aspect of educational ethics, involving interaction, emotional connection, and interpersonal communication between teachers and students. However, as ChatGPT is an educational tool, it may influence the dynamics of teacher-student relationships, leading to alienation and a lack of emotional connection between them. On one hand, in traditional educational models, teachers serve as guides, inspirations, and role models for students, establishing close relationships through face-to-face interactions. However, when the educational process relies on technologies like ChatGPT, students may interact more with the machine and have reduced interaction with the teacher. This can result in distant relationships between teachers and students, lacking genuine emotions and interpersonal communication. On the other hand, educational ethics emphasize the importance of emotional connection and support between teachers and students. The expression of emotions, empathy, and care are indispensable elements in education. However, when the educational

process increasingly depends on ChatGPT, machines often fail to provide genuine emotional responses and support, lacking sensitivity to students' emotional needs. This can render the educational process impersonal and mechanistic, weakening the emotional connection between teachers and students.

Lastly, balancing educational goals with personalized teaching is an important issue in educational ethics, involving attention to students' overall development and cultivation of diverse abilities. In ChatGPT's educational application, personalized teaching is considered an important advantage. ChatGPT can generate personalized teaching content and guidance based on students' needs and characteristics, providing better support and guidance in their learning process. However, an excessive focus on personalized teaching may lead to narrow educational goals and an imbalance in students' comprehensive development. The most immediate manifestation is the imbalance between intellectual education and moral education. Educational ethics demand that the education system pays attention to students' overall development, including cognitive, emotional, social, and moral aspects. Educational goals encompass not only knowledge impartation and skill development but also the cultivation of students' comprehensive abilities, values, and social responsibilities. If personalized teaching is excessively emphasized, other aspects of educational goals may be neglected, impacting students' holistic development.

4. Strategies Based on Ethical Theories

Guided by the ethical principles advocated by five ethical theories, this paper proposes three strategies to address the causes, processes, and outcomes of the technological ethics, academic ethics, and moral ethics challenges posed by ChatGPT: legal regulations and moral constraints, subject awareness and object support, and adherence to essence and educational innovation. These strategies aim to establish a sound legal framework and moral constraint mechanism, emphasize the responsibility and self-awareness of individuals, and maintain the core values of education and the spirit of innovation.

4.1 Legal Regulations and Moral Constraints

The theory of fairness and justice emphasizes that the educational application of ChatGPT must ensure fairness, equality, and sustainability. To achieve this, effective legal regulations and societal moral constraints are necessary to support the educational application of ChatGPT.

Asimov's "Three Laws of Robotics" serves as the theoretical foundation for AI ethics, and many scholars have explored ethical issues concerning the ethical behavior of future AI based on these laws. In 2013, the Institute for the Future proposed the "23 Principles for Artificial Intelligence", providing a comprehensive framework for governing AI for the first time. In 2017, the European Union proposed the development of a charter for robotics, which included civil legislation for robots. However, to date, the introduction of legal regulations for the use of AI products worldwide has not been synchronized. Given that the application of ChatGPT in education is a matter that affects the global education ecosystem, it is imperative to establish unified legal standards worldwide. This will ensure the unified regulation and restriction of ChatGPT's technology development and application, covering aspects such

as data privacy protection, content moderation, and usage limitations. It will also safeguard the rights of students and educational practitioners, preventing misuse and improper usage (Eva et al., 2023). Moreover, these legal regulations should possess flexibility and adaptability to accommodate technological advancements and societal needs. Furthermore, establishing ethical review and regulatory mechanisms is also an important step in ensuring the ethical feasibility of ChatGPT's educational application. By establishing dedicated ethical review institutions or committees to review the development, deployment, and use of ChatGPT and provide improvement suggestions and recommendations, it is possible to effectively monitor and evaluate its compliance with ethical requirements. Such regulatory mechanisms should be timely and effective in responding to emerging ethical issues and technological challenges.

The theory of social contract posits that individuals have interdependence and mutual influence within society. In order to achieve common interests and social stability, people establish consensus and norms through social contracts to constrain individual behavior. In the educational application of ChatGPT, moral constraints can be understood as a manifestation of social contracts, aimed at safeguarding the rights of students and educational practitioners and ensuring that technology developers and relevant entities adhere to moral principles. Moral constraints can be achieved through the cultivation of ethical education and ethical awareness. Educational institutions and schools can enhance ethical education, guiding students to understand ethical principles and values, and fostering their sense of moral responsibility in using technologies such as ChatGPT. Likewise, technology developers and relevant entities should enhance ethical awareness, incorporating ethical principles into the process of technology development to avoid or minimize ethical issues. The cultivation and practice of ethical awareness, in line with the spirit of the social contract, promote interaction and cooperation in the field of education. The ethical governance of artificial intelligence is essentially a regulation of human use of technology. When ethical regulations for the educational application of ChatGPT become a societal consensus, potential ethical issues will be, if not eliminated, significantly reduced.

4.2 Subject Awareness and Object Support

Subject awareness refers to the recognition by students and teachers, who are the primary users of ChatGPT in the field of education, of the existence of ethical issues and their active participation in addressing them. Object support refers to the support and guidance provided by technology developers and other stakeholders to students and teachers in using ChatGPT.

As important participants in educational activities, students should possess subject awareness and recognize the role of ChatGPT as a tool for learning assistance, rather than allowing ChatGPT to become a substitute for active learning. When using ChatGPT for personal learning assistance, students must realize that ChatGPT, as a representation of artificial intelligence, will always be limited by human intelligence. Therefore, they should not underestimate their own abilities and overly rely on ChatGPT, or engage in academic misconduct such as using ChatGPT for essay ghostwriting (Vassilakopoulou et al., 2023). Students should cultivate critical thinking and information evaluation

skills to identify and assess potential biases, errors, or inaccuracies in the generated content of ChatGPT. They need to learn to identify reliable sources of information and approach the generated content with caution. Additionally, as firsthand users of ChatGPT applications, students can actively participate in decision-making and discussions regarding the educational application of ChatGPT. This can include involvement in ethical committees at schools or institutions, engaging in discussions on educational policy development, and communicating with teachers and peers to help shape the development and practice of educational ethics.

Furthermore, the theory of care ethics emphasizes individuals' concern and responsibility for the interests of others. When teachers utilize ChatGPT for teaching assistance, they must assume their role as subjects. Firstly, teachers should understand the applicability and limitations of ChatGPT, which places higher demands on their information literacy. Future teachers need to be aware that the integration of artificial intelligence technology into classrooms and teaching activities is an inevitable trend. Therefore, they must possess the necessary skills to proficiently utilize AI-assisted teaching and guide students in its proper use. Secondly, when guiding students in using ChatGPT, teachers should help students understand the limitations of generated content, encourage independent thinking and creativity, and teach them how to evaluate and use the information generated by ChatGPT. It is particularly important to emphasize the significance of academic integrity and ensure that students understand the consequences of improper use of ChatGPT, such as academic plagiarism and violation of academic ethics. Lastly, when teachers themselves use ChatGPT to generate content, they should critically review the generated content and correct any potential biases, errors, or inaccuracies. When using ChatGPT for educational data analysis, they should also pay attention to the protection of student privacy and personal data, ensuring compliance with relevant privacy and data security regulations. They should choose secure and reliable platforms and tools and adhere to the privacy policies of their institutions or schools. Additionally, teachers must firmly understand their role as educators and recognize that ChatGPT is merely a tool for enhancing learning experiences and teaching effectiveness, not a substitute for human teachers. They should not overly rely on it when designing their teaching methodologies.

As objects, technology developers, schools and educational institutions, government and regulatory bodies, academic communities and professional organizations, as well as the general public, should provide ethical support for the educational application of ChatGPT and participate in social dialogue and collaborative governance with the subjects. Virtue ethics emphasizes individual character and moral qualities, and technology developers should possess moral judgment and a sense of responsibility. They should ensure that the design and implementation of ChatGPT align with ethical principles. For example, during the pre-training process, technical means should be employed to eliminate the risks of algorithmic bias and unfairness, enhance algorithm transparency and interpretability, and maximize the accuracy of algorithmic operations while minimizing misleading information. Schools and educational institutions should formulate policies and guidelines to define the responsibilities and obligations of

teachers and students in using ChatGPT. By organizing training and workshops and providing professional development opportunities, teachers and students can enhance their awareness and understanding of ethical issues. The academic community and professional organizations can conduct research and advocacy, offering ethical guidance and consulting services. They can organize academic conferences and workshops to facilitate discussions and exchanges on ethical issues related to the educational application of ChatGPT. They can also establish industry standards and ethical guidelines to guide ethical practices in the field of education. The involvement of the general public and public participation are crucial in ensuring the ethicality and sustainability of the educational application of ChatGPT. They can engage in public discussions and decision-making, raise concerns, and provide suggestions to promote the examination and resolution of ethical issues.

Through the construction of subject awareness by students and teachers and the object support provided by technology developers, schools and educational institutions, government and regulatory bodies, academic communities and professional organizations, and the general public, a collaborative ethical governance framework can be established. This framework ensures appropriate support and constraints for the educational application of ChatGPT in terms of technological ethics, academic ethics, and educational ethics, minimizing potential ethical risks and ensuring that the educational application of ChatGPT truly aligns with ethical principles and educational values.

4.3 Upholding Essence and Educational Innovation

"Putting people first" is the primary principle of modern educational ethics. The comprehensive development of individuals is the fundamental principle of educational ethics. The concept of "putting people first" fundamentally affirms the role and status of "people" as the subject in social and historical development. It emphasizes the role and purpose of "people" in social and historical development. It is a value orientation and a way of thinking. When we say "putting people first" as an educational philosophy that we should uphold, it fundamentally means that education should be for people, rely on people, and respect people. People are the subjects of education, the objects of education, and the purpose of education. Undoubtedly, people are at the center of educational activities. When we choose "putting people first" as a value, education acquires the meaning of creating human values. Therefore, regardless of the era, even in the era of artificial intelligence, the essence of education still emphasizes the cultivation of individuals. In other words, while ChatGPT empowers education, we still need to adhere to the essence of education and keep pace with the times to achieve educational innovation.

Specifically, first and foremost, it is necessary to ensure fairness in education and equal educational opportunities, bridging the gap between education and the digital divide. At the macro level, this can be achieved through government policy support and resource allocation, such as providing universal internet connectivity and devices, promoting the sharing of open educational resources, and providing economic support to give marginalized groups equal access to and opportunities to use educational tools like ChatGPT. At the micro level, teachers should pay attention to differences in students' technological literacy and technical backgrounds during actual teaching activities and provide

personalized assistance in a timely manner. Furthermore, care ethics theory requires the establishment of a positive teacher-student relationship, emphasizing emotional connections and interactions between teachers and students. When teachers use technologies like ChatGPT, they should maintain genuine communication and emotional interaction with students, encourage students to express their thoughts and questions, and pay attention to students' individual needs and development.

Simultaneously, ethical pragmatism demands diversity and comprehensive development in educational goals during the educational process. Education should not only focus on personalized teaching and the application of technological tools but also insist on cultivating students' multidimensional abilities and comprehensive literacy. It should not only prioritize knowledge impartation but also emphasize students' psychological well-being and socio-emotional development. This requires teachers to promote students' comprehensive development, foster their creativity, critical thinking, and sense of social responsibility through comprehensive evaluation systems and individual counseling.

In addition, virtue ethics theory highlights the importance of students' moral character and value formation. Education should focus on students' moral development and guide them in forming correct values and ethical behavior. When using technologies like ChatGPT, teachers should guide students in understanding and using the technology correctly, avoiding misuse or improper behavior. Through ethics education and ethical discussions, students' moral judgment and autonomous decision-making abilities can be cultivated.

Lastly, in terms of educational innovation, it is necessary to re-examine the coexistence relationship among ChatGPT, students, and teachers and define their roles appropriately. The educational empowerment function of ChatGPT should be utilized reasonably. Under ethical standards, educational innovation with ChatGPT can include personalized customized learning, fostering innovative thinking under the guidance of ChatGPT, and the transformation and upgrading of the teacher's role.

5. Conclusion

The advancement of educational technology inevitably brings about comprehensive changes in the field of education. Just as Asimov's "Three Laws of Robotics," which serve as the theoretical foundation of artificial intelligence ethics, require supplementation and refinement to meet the evolving needs of society, ethical challenges arising from the educational application of ChatGPT also need to be addressed.

This paper explores the ethical challenges in the educational application of ChatGPT. The research findings reveal that the prominent issues currently revolve around technological ethics, academic ethics, and educational ethics. This includes algorithmic bias and unfairness, algorithm transparency and explainability, and technical reliability and misinformation in technological ethics; legitimacy of ChatGPT's involvement as an academic researcher, academic plagiarism and misconduct arising from ChatGPT's text generation, and the inadequacy of the generated content itself in academic ethics; issues of educational fairness and equal opportunities, the alienation of teacher-student relationships,

and the balance between educational goals and personalized teaching in educational ethics. Therefore, based on the framework of the five major ethical theories, the author proposes strategies at the macro level, including legal regulations and moral constraints, subject consciousness and object support, and upholding essence and educational innovation. These measures reflect the construction of a top-down legal system, the active participation of stakeholders, the exploration and cultivation of subject consciousness, and the necessary support from the objects, as well as the adherence to the essence of education and the proactive adoption of innovative educational concepts.

Acknowledgement

I would like to express my heartfelt gratitude to Professor Zhencong Liu, my fellow students Limeijing, Shi Yifan and Zhang Ruizhe, and Beijing International Studies University. Professor Liu has been an inspiring mentor, guiding and providing ideas in education study. My fellow students have provided support, friendship, and enjoyable moments, which ensure the whole research process going smoothly and effectively. Beijing International Studies University has been a platform for the material collection. I appreciates all the contributions to their success and growth.

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