On the Ethical Risks of Artificial Intelligence Applications in Education and Its Avoidance Strategies

Xuemei Ma *, Cuixian Jiang

School of Information Science and Technology, Yunnan Normal University, Kunming, Yunnan, 650500, China

* Corresponding Author Email: 1757104345@qq.com

Abstract. The application of artificial intelligence in education promotes the change and development of education, but at the same time, it also faces some uncertain ethical risks, mainly in the privacy and security problems caused by big data in education, the alienation of algorithm recommendation and students' personality development, and the "digital divide" which aggravates the existing educational inequity. In order to eliminate and avoid these ethical risks, we should build an ethical regulation system for AI education applications, improve the AI education algorithm transparency and data supervision mechanism, and accurately allocate resources to bridge the various AI education gaps and improve education equity. It can have some theoretical guidance for the future moral and ethical behaviors related within the field of education.

Keywords: Artificial intelligence; Education ethics; Strategy.

1. Introduction

In March 2016, the world Go champion Lee Sedol was defeated by Alpha Go, which is considered a milestone event in the development of artificial intelligence, and subsequently, the term "artificial intelligence" has attracted the attention of people from all walks of life. In July 2017, the State Council issued the "Development Plan of New Generation Artificial Intelligence", which clearly pointed out that the cross-fertilization of AI and other disciplines of professional education should be emphasized, and online learning and education platforms based on big data intelligence should be developed to provide accurate push education services [1]. In recent years, the integration of AI and education has been deepening, and it has also given rise to the emergence of intelligent teaching and learning tools, such as intelligent teaching management systems, intelligent tutor systems, educational robots and other forms of practical applications. While these intelligent tools bring convenience to teachers' teaching and students' learning, they also hide some ethical and moral issues. For example, when teachers then use artificial intelligence to collect data on students' learning behaviors, it may involve students' private data, thus threatening students' personal information security; personalized learning resources pushed with the support of big data invariably narrow the scope of learners' access to resources. In conclusion, the application of AI technology in the field of education is closely related to the reform of the education system and educational equity, etc. Only by studying the relevant ethical issues arising from the application of AI in education and establishing sound regulations in accordance with local conditions can its advantageous side be highlighted and the negative aspects avoided. There is a wide space for exploration in the field of educational applications, but the development of AI technology itself is not yet known, and the ethical issues that arise during the integration and development of these two still deserve our consideration and attention.

2. Definition of key concepts

2.1 Artificial Intelligence

Turing, the father of artificial intelligence, proposed as early as 1950 that artificial intelligence embodies the basic logical computational ability of machines to understand and learn [2], and the concept of "artificial intelligence" was first proposed in the United States in 1956. After reading the related literature, we found that there are several explanations for AI: according to computer scientist

Marvin Minsky, AI is the study of making machines learn and solve problems that only humans can do [3]. According to Guangyu Liang and others, artificial intelligence is to make machines have "intelligence" through artificial technology, which is given to systems or machines through programs, algorithms and data, so that machines can imitate humans by learning human language, behavior, etc., and thus have "intelligence This intelligence is given to the system or machine through programs, algorithms and data, so that the machine can imitate humans by learning human language, behavior, etc., and thus have "intelligent" characteristics, and eventually let this "intelligent machine" serve the human world[4]. With the deep exploration of artificial intelligence, the application field of artificial intelligence technology is expanding, and the definition of artificial intelligence is also evolving.

2.2 Application of artificial intelligence in education

The integration of artificial intelligence and education has given rise to the concepts of "artificial intelligence education", "intelligent education" and "artificial intelligence application". At present, many scholars have researched and explained the application of AI in education. Wu et al. argue that AI is used in education to improve the quality of education [5]. Zhiting Zhu et al. argued that the direct application of AI technology in education is intelligent teaching, which has three main connotations, education supported by intelligent technology, education for learning intelligent technology, and education for promoting intelligent development [6]. In this paper, the understanding of AI educational applications refers to the application of AI technology in the field of education, service and teaching management, teaching assessment, education teaching and many other educational scenarios, specifically all kinds of AI educational products in virtual environments and physical devices.

2.3 Ethics

The term "ethics" was first used in China in the Book of Rites and Music, which refers to the relationship between literature and art and social ethics and morality [7]. The definition of "ethics" is more abundantly discussed in academic circles. Zhang Zhizhen et al. use the term "ethics" to refer to the impact of technological applications on various relationships between people [8]. According to Li Junping, the ethical risks that have been and may be caused by AI technologies, including privacy infringement, moral issues, and regulatory gaps, should be addressed by the relevant authorities [9]. Its discussion in this paper refers to the interplay of human, technology, and education in the application of AI technology in the field of education.

3. Current status of domestic and international research

3.1 Status of domestic research

Domestic scholars' research on artificial intelligence education is divided into theoretical research and technology development and practical research. The research represented by Professor Zhu Zhiting mainly focuses on intelligent education based on intelligent theory, such as intelligent education, robot education, personalized learning and future school, etc.; in terms of practical research, more scholars mention intelligent tutor system and conduct related research; in addition, with the advent of digital era, artificial intelligence technology brings development opportunities to education and also brings more challenges, and the possible ethical issues about the application of artificial intelligence in education also draw the attention of relevant researchers. In addition, with the advent of the digital era, AI technology has brought development opportunities and challenges to education, and the possible ethical issues regarding the application of AI in education have also attracted the attention of relevant researchers. Artificial intelligence has become a key variable affecting China's future economic and social development trends, and its educational and usage values have been affirmed while being subject to ethical concerns. By analyzing the relevant literature in recent years, the research on the ethical aspects of AI is still mainly summarized and generalized on the technology studied by foreign scholars, and the research measures on ethical issues have not been implemented

in practice, and the research on the ethical aspects of AI in China is not very deep and the related research is not very mature. Wang Hui (2021), the "excessive" intervention of technology will have an impact on social issues such as educational ethics and educational equity [10].

3.2 Status of foreign research

Compared with domestic research, the most obvious difference between foreign research and domestic research is that foreign research is more inclined to research on the development and application of technology, and the educational application of AI is the main focus of foreign research, and there are researchers abroad who have addressed the ethics of AI education. Hilbert (2016) argues that AI may be a disruptive technology that can exacerbate existing inequalities and divisions, leading to the emergence of a new digital divide [11]. Berendt et al. (2020) argue that the educational applications of AI can affect data protection and privacy when AI technologies are improperly applied [12].

In general, foreign studies on the educational applications of AI are a bit more in-depth, and in terms of quantity, the number of foreign studies in this area has been increasing since the AI boom in 2016, but domestic studies involving ethical issues in AI education were only covered in 2019, and the overall number of journal literature has increased after 2020 but is still small.

4. Ethical Risks of Artificial Intelligence Applied to Education

4.1 Privacy and security issues arising from big data in education

The maturity of key technologies such as deep learning and big data has led to the leap forward development of artificial intelligence technology, and humanity will enter the third wave of artificial intelligence. The integration and development of artificial intelligence technology and education, the collection and storage of learners' learning data will face privacy data leakage and threaten personal information security, etc. The application of artificial intelligence in education is facing ethical issues such as blurring of privacy boundaries and difficulty in safeguarding personal information. In the context of the artificial intelligence era, the connotation of privacy is expanding, privacy boundaries are becoming blurred, personal data may also be mined and monitored, and personal data will become more and more transparent. For example: the impact of the new crown epidemic, the scale of online education is gradually expanding, online learning tends to normalize, all kinds of APP education software has emerged, when users use this type of software, user information may be maliciously leaked to third-party companies, etc., thus threatening the security of the user's property, these private data information once stolen by unscrupulous elements and use it to do illegal and disorderly things, the consequences will be unimaginable. Secondly, smart classrooms monitor students' learning process in real time without dead ends, some sensitive private information of students will be collected and stored, so excessive collection of user information makes the user's personal data threatened, if the server is attacked by malicious hackers, the user's property and even life safety will be threatened, therefore, users should pay attention to the protection of personal privacy data and be vigilant.

4.2 Algorithm recommendation and the development of student personality alienation problem

Personalized learning is another new realm of modern educational thinking, relying on artificial intelligence technology to empower education, can effectively achieve personalized learning, and the key to artificial intelligence lies in the algorithm and the large amount of big data, dynamic intelligence mainly lies in the large amount of data, with the continuous increase of data, with the help of data analysis technology can be the data of the degree of intelligence continues to improve. The algorithm itself does not have a certain objectivity and human emotion-oriented, but only mechanically rely on the large amount of data collected, through deep learning and big data mining to push personalized learning content for the user, in the long run, the user more learning and attention

to the content is only within their own interests, the user will get more and more narrow learning content, the user's interests and preferences outside the information will be filtered, the user In 2019, Brain Co produced the "Fuzzy Head Ring", whose main function is to monitor the learning status of students in class, but the effect of the application is that it affects students' original learning concentration, motivation and learning effectiveness, The application has the effect of affecting students' original learning concentration, motivation and learning effectiveness. In addition, accurate learning content recommendations invariably deprive students of their independent choice in learning, and over-reliance on intelligent learning tools to recommend learning content, and the use of intelligent learning tools to take pictures and search for answers to questions they do not understand, makes students' thinking inert, and over time, students' own personalities will be dissipated by technology.

4.3 The "digital divide" exacerbates the existing educational inequity problem

In the 1960s, the phenomenon of high dropout rate of children from poor families in the field of education in the United States aroused the concern of all walks of life, mainly because of the gap between the rich and the poor in the United States. Instead of narrowing the gap, the gap has widened. The communication community believes that economic disparities and low utilization of smart technologies are important reasons for the existence and widening of the "digital divide". The application of artificial intelligence in education is inseparable from new media technologies such as smart teaching tools, smart learning platforms, and the Internet, and the differences in users' access to and use of smart tools have led to the emergence of the "digital divide.

A sudden epidemic in 2020 forced all industries to shut down their production, and the regular education work in schools was no exception. In contrast, the online teaching in the backward areas is relatively better than in the economically disadvantaged areas, while the network conditions and hardware equipment in the backward areas are not fully covered and popularized, and some areas mainly conduct teaching by video classes. The online teaching platform provides quality learning resources for the education poor, and this online learning method is more favorable to learners with better economic conditions and better infrastructure, while learners with relatively poor economic conditions will have less access to learning resources, which may, to a certain extent, contribute to rather than alleviate the existing educational inequity.

5. Risk Avoidance of Artificial Intelligence Applications in Education

5.1 Establishing a sound system of ethical norms for the application of artificial intelligence in education

The purpose of the application of artificial intelligence technology is to assist teachers in teaching, to teach according to the material and to promote the personalized development of students. The state should strengthen the top-level planning and design of AI educational application, and on the basis of following the general standard norms of AI technology application, it needs to develop norms and standards of AI educational application in conjunction with the actual situation of education and teaching. Marx believes that the improper use of technology will bring about the alienation of people and education, and the direction of development of technology is not necessarily to the good. It is necessary to accelerate the construction of a normative system for the ethics of artificial intelligence education, and to promote the development of the integration of artificial intelligence technology and education in a gradual and orderly manner. The application of intelligent technology can not be accepted in its entirety, to establish the internal consistency of "human-technology-education", to avoid the problem of improper operation of data in the application of artificial intelligence in education, data storage is not safe and bring privacy leaks, if the accident really happened In addition, the relevant staff should have a clear accountability mechanism to ensure the ecological health and orderly development of artificial intelligence education applications.

5.2 Improving AI education algorithmic transparency and data regulation mechanisms

"Algorithmic transparency" means clearly stating the data, what the algorithm actually achieves, and how the machine operates on the basis of the algorithm's internal logic should be clearly understood by all[13]. When artificial intelligence devices recommend learning resources to students intelligently, they need to collect learners' learning data and analyze the learning behavior behind the data before they can make decisions, and in this process learners must also know how artificial intelligence makes personalized learning recommendations for themselves and how artificial intelligence analyzes them. What if the system collects data from the learner and draws incorrect conclusions? The application of artificial intelligence in education should focus on the fairness of the algorithm, open the wall of the algorithm "black box", make the internal logic of the operation of intelligent machines transparent, and minimize or even avoid the possible ethical risks. In addition, for program developers and designers, they should follow the principles of privacy, equality, and non-harm, not to bring their own bias into the design of algorithms and lead to some unreasonable situations, and to ensure the research of algorithms with universal applicability and eliminate algorithmic discrimination. And also be alert to the information data security problems brought to learners by big data in education, to ensure that the storage of learner information data is safe, and relevant education departments should strengthen the supervision of algorithm design and data selection, and develop relevant clear mechanisms.

5.3 Accurate resource allocation, bridging the gap between various types of AI education and improving educational equity

Based on the differences in learners' access to digital learning resources, use of intelligent learning tools and group differences in their educational impact, the national development strategy of "Internet + education" should follow the principle of specific analysis of specific problems, and requires overall grasp and precise investment at macro, meso and micro levels. At the macro level, we should avoid the construction of digital resources in a crude manner, and be good at grasping the main contradictions and implementing targeted measures to bridge the digital divide. At the meso level, while strengthening the construction of Internet infrastructure, it is necessary to timely detect the teaching effects in the application of artificial intelligence technology in education and strengthen the construction and production of high-quality digital resource libraries. At the micro level, it is important to establish and improve effective training mechanisms for information literacy of not teachers, students and relevant education business personnel according to local conditions, enhance the support and supervision role of family education, and improve home-school partnerships to achieve healthy and sustainable development of AI applications in education.

6. Conclusion

The main purpose of artificial intelligence technology-enabled education field is to improve the quality and efficiency of education, cultivate high-quality talents to meet the development needs of the times, and promote the equity of education. For example, online learning for teachers and students separated during epidemic prevention and control, distance learning adopted in vocational education, and learning by MOOCs based on open resources provide us with a mobile learning environment. Technology also brings us some threats, we should clearly understand that the application of technology is used to promote education and teaching, technology is a double-edged sword, we should dialectically look at the relationship between pros and cons, we should not forget that the original purpose of using technology is to promote learning and improve efficiency, not to use technology for the sake of using technology, but to generate greater benefits through the use of technology assistance. Therefore, in the process of information technology to promote educational change, it is important to put technological change education in a human-centered space and time, transform information technology into the real productivity of education, transform the advanced

nature of technology itself into the effectiveness of education, better promote student learning and improve performance, and promote the harmonious unity of people, technology and education.

In the future, AI technology will be applied more and more widely in the field of education, and its application to educational practice can assist or even replace some of the educational practices in some aspects. For example, the application of AI technology in teaching can replace the teacher to complete some repetitive teaching work, and can replace the teacher to produce papers, mark papers, attendance, grading and other work. However, while AI technology brings favorable conditions to education, it may also bring new certain educational risks. But we should not dismiss it all just because there are problems and risks. Instead, we should take the initiative to examine the ethical issues, establish the awareness of possible ethical risks for a rainy day, conduct a multifaceted review and rational thinking, and proactively explore targeted avoidance methods and strategies to promote the better development of AI education.

References

[1] Notice of the State Council on the issuance of a new generation of artificial intelligence development plan [EB/OL]. China government website. [2017-07-20].
http://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm.

[2] Turing M T. Computing machinery and intelligence [J]. Mind, 1950, LIX (236): 433-460.

[3] Minsky M. Steps toward artificial intelligence[J]. Proceedings of the IRE, 1961, 49(1): 8-30.

[4] Leung K.Y. The ethics of artificial intelligence in education [J]. Ethical risks and avoidance of artificial intelligence applied to education[D]. Shanxi Studies, 2021. DOI: 10.27284/d.cnki.gsxiu.2021.000537.

[5] Wu YH, Liu BW, Ma XL. Constructing an ecosystem of "artificial intelligence + education"[J]. Journal of Distance Education,2017,35(05): 27-39.DOI: 10.15881/j.cnki.cn33-1304/g4.2017.05.003.

[6] Zhu Zhiting,Peng Hongchao,Lei Yunhe. Intelligent education:the practical path of smart education[J]. Open Education Research,2018,24(04):13-24+42.

[7] Zhang Enpu. Exploration of the literary critical thought of the Book of Rites and Music [J]. Journal of Ancient Books Collation and Research, 2006(1):35-37.

[8] Zhang Zhizhen, Zhang Lingling, Xu Xueying, Liu Jialin. A metaphorical analysis of the teaching role of artificial intelligence: an example of a high-impact project in the field of artificial intelligence education.A case study of a high-impact project in artificial intelligence education application[J]. China Distance Education, 2019(11):24-37+57+93.

[9] Li Junping. Research on the ethical issues of artificial intelligence technology and its countermeasures [D]. Wuhan University of Technology,2013.

[10] Wang Hui. Opportunities and Challenges: Educational Reflection in the Context of Artificial Intelligence[J]. Educational Theory and Practice,2021,41(34):10-14.

[11] HILBERT M.Big Data for Development: a Review of Promises and Challenges[J].Development Policy Review,2016(1) : 135-174.

[12] BERENDT B, LITTLEJOHN A, BLAKEMORE M.AI in Education: Learner Choice and Fundamental Rights[J]. Learning, Media and Technology,2020(3):312 -324.

[13] Zhang K.Y., Zhang J.N. New zones, misconceptions, blind spots and forbidden areas in the application and research of artificial intelligence in education[J]. Journal of Distance Education,2017,35(05):54-63.