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The Impact of Artificial Intelligence on Teachers' Ethical Decision-Making in Educational Assessment

Linmin Lei*

Faculty of Education, Guangxi Normal University, Guilin, China
**Corresponding author:gxsfjyxb2023@163.com*

Abstract: *AI technology is becoming increasingly widespread in today's education field, especially in educational assessment. The gradual involvement of AI in the educational assessment process has brought about a revolutionary change in the traditional education model, and the impact on teachers when faced with ethical decision-making has become increasingly significant. Through a systematic literature review and analysis, although AI technology has advantages in enhancing assessment efficiency and accuracy, it may also weaken teachers' autonomy and ethical judgment in decision-making. AI involvement may be biased, further exacerbating the complexity of teachers' ethical decision-making. The paper concludes with suggestions on how to enhance teachers' ethical decision-making ability with the assistance of AI and provides directions for future research.*

Keywords: *Artificial intelligence, Educational assessment, Ethical decision-making, Teacher autonomy*

1. Introduction

1.1. Research Background

With the rapid development of information technology, artificial intelligence has become one of the main driving forces for change in all walks of life worldwide in the 21st century. AI technology covers almost every aspect of the education process, from classroom teaching to education management and assessment. Especially in education assessment, the introduction of AI technology has dramatically improved assessment efficiency and accuracy. For example, automated grading systems can quickly process large amounts of test data, and personalized learning analytics tools can provide tailored learning advice based on student performance data (Sun and Zhou, 2024)[1]. These technologies free up teachers' time and energy, making educational assessments more objective and efficient.

1.2. Statement of the Problem

The rapid development and widespread use of artificial intelligence technology have undoubtedly revolutionized educational assessment. However, this change also poses new challenges to the traditional role of teachers. Teachers need to adapt to the new technology and make complex ethical decisions with the new technology; when an AI-automated scoring system shows possible bias against certain groups, how do teachers deal with the results? How do you balance AI-generated assessment results and teachers' professional judgment? These issues are related to the fairness of educational assessment and directly affect students' learning experience and future development. More importantly, the introduction of AI technology may diminish teacher autonomy. Teachers may rely on AI systems' data and analysis results, thus neglecting their ethical judgment. This phenomenon raises concerns about teachers' ethical decision-making capacity. Will teachers give up thoughtful consideration of complex issues because of their over-reliance on AI? Will the "black box" nature of AI technology cause teachers to feel powerless in the decision-making process? These are questions that need to be addressed in current research.

There is a lack of systematic research in the existing literature on AI's possible long-term ethical implications in educational assessment. Most of the studies focus on short-term application effects, such as scoring accuracy and efficiency improvement, but lack in-depth exploration of the impact that the long-term application of AI technology in the education system may have on educational equity, student development, and teachers' professional identity. The complexity and multidimensionality of these issues imply the need for an interdisciplinary research perspective, combining theories and methods from various fields, such as pedagogy, ethics, and AI, to conduct systematic research (Wang et al., 2024)[2].

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2. Relevant concepts and explanations

2.1. Application of artificial intelligence in educational assessment

The application of artificial intelligence technologies in educational assessment has made significant progress, covering everything from automated scoring to personalized learning analysis. Automated scoring systems, such as natural language processing (NLP)-based essay scoring tools, can quickly generate scoring results by analyzing multidimensional features such as grammar, structure, and vocabulary use of the text. This dramatically improves the scoring efficiency and reduces the subjective bias in human scoring. In addition, predictive analytics tools based on machine learning algorithms can predict a student's future academic performance based on his/her historical learning data, helping teachers to identify potential academic risks early and take intervention measures.

However, using artificial intelligence in educational assessment is not without challenges. For example, automated scoring systems often rely on the quality and size of training data, which may be biased or insufficient, leading to systematic errors in scoring results, and the "black box" nature of AI systems, in which the decision-making process is opaque, often makes it difficult for teachers and students to understand the basis for scoring, which can lead to mistrust of the assessment results. The "black box" nature of AI systems, i.e., the opacity of their decision-making process, often makes it difficult for teachers and students to understand the basis of the scoring system, which in turn leads to distrust of the assessment results. Nonetheless, with the advancement of technology and the increase in data, the prospect of applying AI in education assessment is still widely recognized.

In addition to automated grading, AI has also been used to design personalized learning paths and dynamic assessments. Personalized learning systems adjust the content and difficulty of instruction to suit the individual needs of each student by analyzing student learning behaviour data in real time. This dynamic assessment improves student learning and helps teachers better understand their students' learning process. These technologies also bring new ethical issues, such as data privacy protection and the impact on student's mental health, which need to be taken seriously along with the application of technology (Gu, 2024; Sun and Zhou, 2024)[1,3].

2.2. Ethical decision-making

Ethical decision-making refers to the choices made by individuals or groups guided by values when faced with moral and ethical issues. Teachers often face various ethical dilemmas in their educational practices, such as treating students from different backgrounds fairly and maintaining objectivity and fairness in evaluating students. Teachers' ethical decision-making not only affects students' academic performance but also profoundly impacts students' value formation and psychological development, and teachers' ethical decision-making ability is regarded as an essential part of educators' professionalism (Lan et al., 2024)[4].

Ethical decision-making theory usually includes several key steps: problem identification, moral assessment, choosing a decision path, implementing the decision, and reflecting on it afterwards (Wang et al., 2024)[2]. In educational situations, teachers need to constantly weigh different values such as fairness, caring, and responsibility in these steps, and when faced with a situation where a student shows significant improvement but his or her test scores are still not up to standard, teachers may need to make an ethical decision between strictly enforcing the grading criteria and moderately adjusting the grading in order to encourage the student.

2.3. Intersection of Artificial Intelligence and Ethics

The intersection of AI technology and ethical issues has been a hot topic of concern in academia and society. In education, the application of AI technology has made this intersection more complex and diverse, and the issue of transparency of AI systems in data processing and decision-making has triggered extensive ethical controversies. Since the internal workings of most AI systems, intense learning models, are complex, it is difficult for outsiders to understand their decision-making processes fully, and this "black-box" nature may lead to teachers feeling confused or uneasy when confronted with AI-generated assessment results.

Algorithmic bias is another ethical concern. AI systems are often trained on large amounts of historical data that may contain intentional or unintentional human biases. These biases are amplified in AI models and may result in certain groups of students being systematically underestimated in

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assessments. Studies have shown that in some cases, AI-automated scoring systems may lower scores for essays by non-native or minority students. This not only violates the principle of educational equity but may also negatively impact these students' self-confidence in learning and future development (Qi and Zhou, 2024)[5].

Applying AI technology in educational assessment also poses the ethical challenge of privacy protection. Personalized learning systems must collect and analyze many students' perceptions, including sensitive information such as academic performance and behavioural status. If these data are misused or leaked, it will cause serious infringement of students' privacy rights. In addition, students may consent to data collection without their knowledge or understanding, thus further exacerbating the complexity of privacy protection.

Using AI in educational assessment may affect teachers' professional autonomy and ethical responsibilities. Whereas in traditional assessment, teachers make ratings and feedback based on their professional knowledge and ethical judgment, with the assistance of AI, teachers may become increasingly dependent on the results of the AI system's analysis, thereby neglecting to be thoughtful about the assessment process. This dependence may weaken teachers' ethical decision-making ability, making them more inclined to choose technological rather than humanistic solutions when confronted with complex ethical issues. This trend could have far-reaching implications for the nature of education.

3. Advantages of the application of industrial intelligence in educational assessment

3.1. Improving the objectivity and fairness of assessment

The application of artificial intelligence in educational assessment significantly improves the objectivity and fairness of the assessment process. It has become an important driving force for improving the quality of modern education and provides strong support for constructing a more fair, efficient, and personalized education system.

First, with its powerful data processing capabilities, artificial intelligence can achieve rapid and accurate analysis of massive learning data, effectively avoiding the subjective bias and omissions that may exist in traditional manual assessment. AI can objectively quantify students' academic performance, learning progress and ability development through algorithmic modelling, providing teachers with a more accurate and comprehensive basis for evaluation and effectively reducing their workload.

Secondly, the application of artificial intelligence in education assessment ensures the consistency and transparency of assessment standards. Through preset assessment rules and indicator systems, AI can perform assessment tasks automatically, reducing the impact of human factors on assessment results and thus enhancing the fairness of assessment. This not only helps eliminate unfairness in the assessment process but also promotes the rational distribution of educational resources and protects the rights and interests of each student (Zehner and Hahnel, 2023)[6].

In addition, AI enables personalization and dynamic adjustment of the assessment process. Through in-depth analysis of students' learning behaviours, AI can identify each student's unique needs and potential and tailor the assessment program to achieve precision and differentiation. This personalized assessment not only enhances the relevance and effectiveness of the assessment but also stimulates students' interest and motivation in learning and promotes their overall development.

3.2. Individualized assessment and advice

Traditional education assessment often adopts a one-size-fits-all approach, making it difficult to consider each student's uniqueness and differences. Through deep learning and extensive data analysis technology, AI can accurately capture each student's learning behaviour, interest preferences and ability level, thus realizing the personalization of assessment and promoting the double enhancement of education fairness and quality. This kind of personalized evaluation not only can more accurately reflect the actual learning situation of students but also can effectively stimulate students' learning enthusiasm and self-confidence.

More importantly, AI can provide customized learning suggestions for each student based on personalized assessment results. These suggestions include the optimal selection of course content and learning methods, time management, and other aspects of the guidance designed to help students improve their learning efficiency and effectiveness. In addition, the AI can dynamically adjust the content of the

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advice based on the student's learning progress, ensuring that the assessment is continuous and forward-looking.

3.3. Automated Processing and Efficient Assessment

In education, assessment, as a key part of measuring teaching quality and student learning effectiveness, has always faced the challenges of cumbersome processing, time-consuming and inefficient. The introduction of AI technology has brought a new solution to this challenge, and its advantages of automated processing and efficient assessment are particularly significant.

Artificial intelligence dramatically simplifies the assessment process through automation. Traditionally, education assessment requires many human resources to collect, organize and analyze data, which is time-consuming, labour-intensive and prone to human error. Artificial intelligence, on the other hand, can complete these tasks quickly and accurately, realizing real-time analysis and mining of massive educational data through an automated data processing system, significantly improving the assessment's efficiency and accuracy (Pearce and Chiavaroli, 2023)[7].

In addition, the efficient assessment capability of AI enables teachers to obtain assessment results in a more timely manner and adjust their teaching strategies accordingly. In the traditional assessment model, the feedback of assessment results often lags behind the teaching process, making it challenging to guide teaching improvement promptly. AI, on the other hand, can track students' learning dynamics in real-time and generate assessment reports instantly, providing teachers with immediate feedback and decision-making support, which promotes the continuous optimization and improvement of teaching. This efficiency gives teachers more time and energy to focus on students' individual development and emotional needs.

4. The Impact of Artificial Intelligence on Teachers' Ethical Decision-Making

4.1. Challenges to ethical principles

With the wide application of AI technology in education, it is gradually infiltrating into teachers' daily work, including instructional design, student assessment and even ethical decision-making, thus posing unprecedented challenges to the traditional ethical principles of education.

The intervention of artificial intelligence has made certain decisions in the educational process more automated and data-driven. While this trend increases efficiency, it may diminish teachers' initiative and responsibility in ethical decision-making (Gardner et al., 2021)[8]. Teachers must re-examine their role in ethical decision-making to ensure they do not lose their adherence to ethical principles in education while utilizing AI to assist decision-making.

Second, the application of AI raises new ethical questions about data privacy, algorithmic bias, and so on. For example, analyzing student behaviour based on big data may violate students' privacy, while bias in algorithmic models may lead to an unfair distribution of educational resources (Lan et al., 2024)[4]. These issues require teachers to have the traditional knowledge of educational ethics and the ability to deal with new types of ethical challenges, such as data protection awareness and algorithmic fairness.

Finally, the rapid development of AI requires teachers to continuously update their knowledge and skills to adapt to the new educational environment. This includes learning the basic principles of AI, understanding its ethical risks, and mastering relevant ethical decision-making frameworks. Only by continuously improving their professionalism and ethical awareness can teachers better cope with the ethical challenges posed by AI and ensure that educational activities are just, fair and effective.

4.2. Changes in the decision-making process

With the increasing maturity of AI technology, its application in the field of education has not only changed the way of teaching but also profoundly affected the ethical decision-making process of teachers. This change is reflected in multiple dimensions, reshaping teachers' thinking paths and action strategies when facing ethical dilemmas.

The introduction of artificial intelligence provides teachers with unprecedented information support. In the ethical decision-making process, teachers can use AI systems to quickly collect and analyze relevant data and obtain a more comprehensive and objective information base. This information

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advantage makes the decision-making process more rational and scientific and helps reduce the influence of subjectivity and bias (Qi and Zhou, 2024)[5].

Second, AI's intelligent assistance function promotes decision-making efficiency. Traditionally, teachers may need to spend much time and energy on research and consultation to make ethical decisions. In contrast, AI can provide teachers with immediate and accurate decision-making advice through automated processing and intelligent recommendation, which greatly shortens the decision-making cycle and improves decision-making efficiency.

In addition, AI prompts teachers to reflect on and optimize the processes and methods of ethical decision-making. In an educational environment coexisting with AI, teachers must constantly explore how to effectively integrate AI technology into the ethical decision-making process and ensure the fairness, transparency and credibility of AI-assisted decision-making. This process will improve teachers' ethical decision-making ability, and the decision-making process will become more standardized and professional.

4.3. Lack of accountability mechanisms

The automation and complexity of AI technology in educational assessment make it difficult to trace and explain the system's decision-making mechanisms. With the widespread application of AI technology in education, teachers' decision-making processes increasingly incorporate AI assistance and advice. However, this change has not been accompanied by the timely establishment and improvement of the corresponding accountability mechanisms, which has given rise to a series of ethical and responsibility concerns.

First, when teachers rely on AI systems to make ethical decisions, defining the attribution of responsibility becomes difficult if the decision-making results are problematic. As an auxiliary tool, AI systems make decisions based on a large amount of data and analysis. However, they are inevitably affected by various factors, such as algorithm design and data quality, and potential deviations and risks exist. The lack of a precise accountability mechanism may lead to shifting responsibilities between teachers and AI systems in the event of problems, jeopardizing the interests of students and parents.

Second, the lack of accountability mechanisms may also weaken teachers' awareness of the prudent use of AI technology. In the absence of effective regulation and accountability, teachers may rely too much on AI systems and neglect the importance of their own ethical judgment. They may even blindly adopt AI's suggestions without fully understanding its decision-making logic, thus triggering more serious ethical problems (Zheng et al., 2024)[9].

Therefore, it is essential to establish a sound accountability mechanism for AI-assisted ethical decision-making. This requires the joint efforts of education departments, schools, and teachers to clarify the scope and boundaries of the application of AI technology in education, establish clear criteria for the division of responsibilities and accountability mechanisms, and ensure that AI technology does not jeopardize the ethics and fairness of education while promoting its development.

5. Suggestion

5.1. Strengthening Ethics Education and Training for Teachers

Ethics education and teacher training should be strengthened in response to the ethical issues raised by AI technology in education assessment. This is not only to cope with the challenges brought about by technological changes but also the cornerstone for guaranteeing the fairness, justice and quality of education.

First of all, educational institutions should pay attention to cultivating teachers' ethical literacy and incorporate ethics education into the mandatory curriculum for teachers' professional development. Through systematic study of ethical theories and case studies, teachers' understanding and recognition of the ethical principles of education should be enhanced, and their judgment and decision-making power in the face of complex ethical dilemmas should be strengthened.

Second, special ethical training should be provided for the specific application of AI in educational assessment. The training should cover the basic principles of AI technology, identification of ethical risks, protection of data privacy, and assessment of algorithmic fairness. This will help teachers understand the limitations and potential problems of AI technology and learn to adhere to the bottom line of educational

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ethics while utilizing AI-assisted assessment (Liu and Qiu, 2024)[10].

In addition, teachers should be encouraged to participate in ethical seminars and exchanges, share experiences and lessons in ethical decision-making, and jointly explore new topics in educational ethics in the era of AI. A more complete and scientific ethical decision-making framework and guiding principles can be formed through the collision and integration of collective wisdom.

5.2. Establishment of a sound data protection mechanism

A sound data protection mechanism is essential to ensure student data security and privacy. First, educational institutions should establish strict data protection policies and norms to clarify the principles and boundaries of data collection, storage, processing, and use. These policies should ensure legality, legitimacy, and minimization of data, i.e., only necessary data should be collected and used for precise purposes to avoid data abuse and leakage.

Secondly, technical protection measures should be strengthened by adopting encryption technology, access control, data backup, and recovery to ensure the security of data during transmission, storage, and processing (Ramachandran et al., 2023)[11]. At the same time, regular security audits and vulnerability scans of the system should be conducted to identify and repair potential security risks in a timely manner.

In addition, a sound emergency response mechanism for data leakage is established so that once a data leakage incident occurs, the emergency response plan can be activated quickly, effective measures can be taken to minimize the loss, and relevant parties can be informed of the situation promptly, maintaining transparency and credibility.

Finally, strengthen education on data protection awareness for students and parents, guiding them to understand the importance of data protection, learn to protect personal privacy, and avoid leaking personal information in an unsafe environment. At the same time, it raises the awareness of data protection among teachers and students to avoid data leakage and misuse.

5.3. Improving Teachers' Data Analysis Ability

With AI technology being widely applied in educational assessment, teachers should have specific data analysis skills. Improving this ability helps teachers better understand the assessment results and promotes the scientific rationality of ethical decision-making.

First, educational institutions should organize regular training in data analysis skills to help teachers master essential data analysis tools and methods. These trainings can cover the use of data analysis software, the popularization of statistical knowledge, and data visualization skills so that teachers can independently complete simple data analysis tasks (Shyr et al., 2019)[12].

Secondly, teachers are encouraged to participate in actual data analysis projects to enhance their practical ability in data analysis through practical exercises. Schools can set up special data analysis groups or workshops, organize teachers to conduct research on specific educational issues, and jointly explore the educational laws and phenomena behind the data.

In addition, strengthening interdisciplinary cooperation and communication is also a meaningful way to improve teachers' data analysis ability. Teachers should actively cooperate with experts in computer science, statistics and other related fields to jointly study the data analysis problems in educational assessment, learn from the advanced experience and technical means in other fields, and constantly expand their vision and ideas of data analysis.

Finally, teachers should maintain their sensitivity and enthusiasm for learning new technologies and methods and constantly update their knowledge systems and skill reserves. By attending academic seminars and reading specialized literature, they should understand the latest developments and research results in the field of data analysis, injecting new vitality and inspiration into their data analysis work.

5.4. Building a multi-party ethical governance system

The construction of a multi-party ethical governance system is the key to ensuring the healthy development of AI technology in educational assessment. This system aims to form a synergy to deal with ethical issues and safeguard the fairness and transparency of educational assessment through the joint participation of multiple parties, including the government, schools, teachers, students and parents.

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First, the government should formulate and improve relevant laws and regulations to clarify the scope and boundaries of AI's application in education assessment and provide legal protection for ethical governance. At the same time, it should strengthen supervision and severely punish violations to maintain the seriousness of education assessment.

Second, schools should establish a specialized ethical governance body or committee responsible for monitoring and evaluating the use of AI in educational assessment to ensure the ethical compliance of technology applications. At the same time, communication and exchange with teachers should be strengthened to listen to their confusion and needs in ethical decision-making and provide necessary support and guidance.

In addition, teachers should actively participate in the ethical governance process and take the initiative to improve their ethical literacy and decision-making ability. By participating in training and seminars, they should understand the latest ethical theories and practices to provide a basis for more scientific and rational ethical decision-making. Students and parents, as direct stakeholders of educational assessment, should also be included in the ethical governance system. Schools should establish open communication channels to listen to their opinions and suggestions and protect their legitimate rights and interests.

6. Summary

Although the widespread application of AI technology in educational assessment has brought about significant technological advances, it has also raised new challenges and requirements for teachers' ethical decision-making. By strengthening ethical education and training, establishing a sound data protection mechanism, improving teachers' data analysis ability, and constructing a multi-party ethical governance system, these challenges can be better addressed to promote the healthy development of AI in educational assessment and to provide strong support for the comprehensive development of students and the ethical decision-making ability of teachers.

While existing research has initially explored these issues, many areas still need to be further explored. Future research should focus on maintaining and enhancing teachers' ethical decision-making abilities while advancing technology to ensure fairness, transparency, and humanity in educational assessment. This has important implications for educational practice and provides new directions for research on educational technology and ethics.

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