ARTIFICIAL INTELLIGENCE (AI) AND ETHICS OF EDUCATIONAL RESEARCH

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Abstract

The integration of Artificial Intelligence (AI) into educational research is rapidly advancing, offering innovative opportunities for personalized learning and data-driven insights. However, the ethical implications of AI use in education, including concerns about data privacy, algorithmic bias, transparency, and accountability, present significant challenges that must be addressed. This study examines the ethical dimensions of AI in educational research, focusing on how these technologies can be implemented in a way that respects ethical standards and promotes equity. Using a qualitative research methodology, it conducts in-depth interviews with key stakeholders, including educators, educational researchers, AI developers, and policymakers. Additionally, thematic analysis of relevant policy documents, AI ethics guidelines, and case studies provides a comprehensive understanding of the current ethical landscape. Through these methods, the research identifies prevalent ethical concerns and explores the perceptions and experiences of those directly involved with AI in educational settings. The findings reveal a widespread need for improved ethical oversight, highlighting issues such as inadequate data protection measures, the perpetuation of biases through AI algorithms, and a lack of transparency in AI decision-making processes. Participants emphasize the importance of involving diverse stakeholders in the development and deployment of AI systems to prevent these technologies from reinforcing existing educational inequities. The study concludes with recommendations for developing robust ethical frameworks and participatory approaches that include input from educators, students, and communities to guide the responsible use of AI in educational research. By prioritizing ethical considerations, this research aims to contribute to a balanced approach that harnesses AI's potential while safeguarding against its risks, promoting an equitable and ethical future for AI in education.

Introduction

Artificial Intelligence (AI) has profoundly influenced the educational landscape, demonstrating that machines can now perform tasks once exclusively reserved for human intelligence. AI encompasses a broad range of systems that increasingly permeate diverse fields such as robotics, neural networks, natural language processing, machine learning, and computer vision, among others. It has enhanced data collection and analysis, enabling quicker and more precise decision-making. The scale, scope, and impact of AI integration are deeply felt across various aspects of human life, including education.

Educational research, as old as education itself, has long been essential for expanding knowledge, addressing societal challenges, and offering solutions to pressing problems. It is conducted systematically and empirically to fill knowledge gaps, improve practices, replicate findings, and enhance pedagogy. AI has significantly transformed the research process by improving data analysis, speeding up literature reviews, and increasing the overall accuracy of research findings. One major area of AI's influence is data processing. AI-driven tools, such as machine learning algorithms, allow researchers to analyze vast datasets with speed and precision, a task previously difficult with traditional methods. These tools can uncover patterns and trends, leading to insights that might have been missed by human researchers. For instance, in genomics, AI systems analyze genetic sequences, facilitating groundbreaking discoveries about the relationships between genes and diseases (Brinkmann, 2020).

AI has also revolutionized the literature review process. Systems powered by natural language processing (NLP) algorithms can scan thousands of academic papers, extract relevant information, and summarize key findings, helping researchers stay current in their fields while significantly reducing the time required for manual reviews (Zeng et al., 2020). Moreover, AI-driven systems are increasingly integrated into the peer review process, assisting journal editors in identifying issues such as plagiarism and ensuring the integrity of published research (Li et al., 2021).

Hence, AI has improved experimental design and predictive modeling. By simulating complex systems and testing various hypotheses, AI enables researchers to refine their experiments before conducting them in real-life settings, thus reducing costs and accelerating innovation (Kitano, 2018). AI writing tools like ChatGPT, Quilbot, Grammarly, and others have also emerged as valuable resources for enhancing the quality of educational research and academic writing, making AI indispensable to modern research and scholarship.

However, ethical concerns in educational research have risen dramatically to an alarming degree. The continuous evolution of AI and the increasing reliance on it in various aspects of life have significantly diminished human involvement. AI now handles tasks once dependent on human labor, from manufacturing to decision-making, fueling fears that human roles are being reduced in favor of automation (Brynjolfsson & McAfee, 2014). While AI often replaces routine tasks, it tends to complement humans in more complex roles rather than fully displacing them (Autor, 2015).

Nonetheless, AI has exacerbated ethical issues in academic research, notably encouraging academic fraud at a disturbing rate. This raises pressing questions: What is the extent of AI's involvement in academic research? How does AI negatively impact academic research and contribute to ethical dilemmas? And how can this troubling trend of academic decline be reversed? These questions will shape the core focus of this chapter.

Conceptual Analysis

Artificial Intelligence

The diverse and complex research in the field of AI makes it quite difficult to project a universal definition. One of the earliest definitions came in 1956, the year AI was discovered as an acceptable field of science when John McCarthy defined the term as the development and use of machines to execute tasks that usually require human intelligence (Hoadley & Lucas, 2018). Artificial Intelligence, broadly speaking, may be defined as a branch of computer science that investigates and develops computational approaches and techniques that allow machines to perform tasks that would normally require some level of human intelligence. In other words, making machines intelligent (Russell & Norvig, 2021). Similarly, Bundy (2017) conceived AI as the branch of computer science dealing with the reproduction or mimicking of human-level intelligence, self-awareness, knowledge, and thought in computer programs. Looking at all these conceptual clarifications and descriptions of AI, one repeated attribute is that AI aims to develop human-level intelligence in machines. The European Commission (2018) defined AI as systems that display intentional behavior through the analysis of their environment and take specific actions, with some degree of autonomy to achieve specified goals. IT Modernization Center for Excellence (2020), has operationally conceived AI as any artificial system that performs tasks under varying and unpredictable circumstances without significant human oversight, or that can learn from experience and improve performance when exposed to data sets. An artificial system developed in computer software, physical hardware, or other context that solves tasks requiring human-like perception, cognition, planning, learning, communication, or physical action. An artificial system designed to think or act like a human, including cognitive architectures and neural networks. A set of techniques, including machine learning that is designed to approximate a cognitive task. An artificial system designed to act rationally, including an intelligent software agent or embodied robot that achieves goals using perception, planning, reasoning, learning, communicating, decision-making, and acting.

Educational Research

The concept of research needs to be explored before discussing the specific nature of educational research. According to Creswell and Guetterman (2019), educational research is the systematic application of various methods designed to provide reliable information about educational challenges, aiming to enhance teaching, learning, and policy. It employs both qualitative and quantitative methodologies to examine educational practices, strategies, and outcomes, with the ultimate goal of improving the education process.

Educational research is characterized as a systematic investigation that involves studying materials and sources to establish facts and reach new conclusions regarding educational practices, policies, and learning environments (Johnson & Christensen, 2020). It seeks to develop evidence-based practices that enhance teaching and learning outcomes. Research, in general, is marked by meticulously designed procedures that emphasize rigorous analysis. It requires expertise, aims to develop generalizations, principles, or theories for predicting future occurrences, and is based on observable experiences or empirical evidence. It involves gathering new data from primary sources or repurposing existing data, while striving to be objective and logical. Every test is applied to validate the procedures, data, and conclusions, with the goal of solving unsolved problems.

Mizanur (2020) defines educational research as a systematic investigation using empirical methods to address educational problems. This type of research follows rigorous scientific processes to collect and evaluate data, with the aim of generating solutions and advancing knowledge. In other words, educational research aims to gain a deeper understanding of the educational process, usually with the goal of enhancing its efficiency. It applies scientific methods to the study of educational issues.

Crawford (2019) describes educational research as a systematic and refined way of thinking, employing specific tools to arrive at more adequate solutions to problems. It involves the systematic study of questions related to teaching, learning, and educational systems, with a primary goal of gaining deeper insights into educational phenomena, generating new knowledge, and improving educational practices and policies. The field covers a wide range of methodologies, including qualitative, quantitative, and mixed methods, each suited to different types of research questions.

Key aspects of educational research include exploring teaching strategies, curriculum development, policy implementation, student learning, and educational equity. Researchers focus on identifying problems within educational systems and developing evidence-based solutions to improve learning outcomes. This type of research plays a crucial role in shaping policy decisions, informing curriculum reforms, enhancing classroom practices, and fostering educational innovation.

Research Ethics

Resnik (2020) asserted that research ethics suggest a complex set of values, standards, and framework of norms and schemes, that embody and regulate educational and scientific activity. Essentially, research codifies the ethics of research in practice. In other words, it is based on the general ethics of science, just as general ethics is based on common sense and morality.

Research is often intertwined with other specialist activities. Academic disciplines are clusters of activities, and it is useful to distinguish between five kinds. Like all other disciplines, cultural and social studies involve research, studies, science communication, specialist activities (e.g. consultancy, planning, and therapy), and the management of institutions. In furtherance of this, scholars' professional activities lead to five kinds of results: scientific publications, graduates, contributions to the formation of public opinion, improvements for users, and well-functioning institutions (e.g. universities, university colleges, and research institutes). Although the Guidelines primarily focus on research, to some extent they also refer to activities in the interface between studies, communication, specialist activities, and the management of the institution

Research ethics refer to the specific principles, rules, guidelines, and norms of research-related behavior that a research community has decided are proper, fair, and appropriate

Artificial Intelligence and Education

Artificial Intelligence (AI) has made significant strides in educational research, offering a profound and transformative impact for researchers and academicians alike.

Mureșan (2003) highlights that AI brings numerous benefits to research by streamlining data collection and analysis. It also enhances personalized learning, provides instant feedback, and improves efficiency in assessment processes. AI algorithms can be integrated into online teaching, learning, and research platforms, allowing content and activities to be tailored to the needs and knowledge level of each student or respondent.

Mureșan (2023) further observes that learning management systems can leverage AI to offer personalized recommendations, automatic feedback, and monitoring of student progress. This ensures that students have access to relevant materials and resources based on their individual needs. Additionally, AI-driven virtual reality tools encourage collaboration and teamwork, while platforms like social media can connect students with peers and instructors, enhancing the learning environment.

Moreover, AI can create tutorials and interactive virtual assistants, which can answer student questions, provide supplementary explanations, and offer real-time guidance throughout the learning process. By utilizing such tools, students receive individualized support and learn at their own pace with real-time assistance (Mahendra, 2023).

AI is also capable of verifying the authenticity, reliability, and accuracy of research data and findings. It can automate various administrative tasks in teaching, such as grading assignments, evaluating learners, offering feedback, and detecting ethical concerns like plagiarism. Additionally, AI algorithms and machine learning can be applied to research processes to recognize patterns and evaluate survey responses. This allows researchers to receive quick and detailed feedback, organize responses, analyze data, and provide evidence-based answers efficiently.

When used to assess learning outcomes, AI offers personalized interventions tailored to each student's needs, ultimately saving time and resources (Mureșan, 2023). Another key contribution of AI in education is its ability to adapt to individual learners' needs. By collecting and analyzing data on student progress and performance, AI identifies areas of difficulty and uses sophisticated algorithms to create content and learning methods that effectively support personal growth and improvement.

Artificial Intelligence and Educational Research Ethics

The applications of artificial intelligence in educational research have prominently appeared as one of the most pivotal achievements of the century. It is to such a degree that the complexity and intelligence of this technology have led to potentially extensive ethical threats that trigger a pressing need for risk-intensive procedures to ensure the quality of delivery (UNESCO, 2019). Indeed, a sense of flexibility that acknowledges human values within the developing momentum of AI is vital to fostering sustainable innovations (Nguyen, Ngo, Hong, Dang., & Nguyen, 2023). Researchers face different ethical questions while researching educational and societal issues. Researchers are encouraged to protect human research participants, their identity, confidentiality, and factual representation. However, as Bouhouita-Guermech, Gogognon, and Bélisle-Pipon (2023) observe, it is not always simple to balance the common good (i.e., develop solutions for the wider population) and the

individual interest (i.e., research participants' safety). Artificial intelligence has massively exacerbated these fears. With AI's fast growth, another set of issues is added to the existing ones: data governance, consent, responsibility, justice, transparency, privacy, safety, reliability, and more (Samuel and Derrick, 2020). Here, an attempt to describe the views on current AI, key ethical concerns, and the challenges it poses to educational research will be critically looked at.

Ethical Concerns in AI

The use of AI in education has unlocked considerable opportunities, but it also raises significant ethical questions that scholars are increasingly examining. Key concerns involve data privacy, consent, and the credibility and authenticity of AI-generated facts. These issues are particularly relevant as AI systems become more integral in conducting research, making decisions, and shaping educational content and policies. While AI provides efficiency and analytical prowess, its growing role in research and education has sparked debate over the moral and ethical implications of its influence. Bouhouita-Guermec et al. (2023) argue that AI and robots cannot be assigned moral agency, primarily because they lack the inherent ability to solve problems ethically. Unlike humans, who can reason morally and consider the broader impact of their actions, AI systems operate based on predefined algorithms and data sets. These systems cannot genuinely reflect on ethical dilemmas or grasp the moral significance of their decisions. This limitation is central to the debate about AI's role in fields where ethical judgment is critical, such as education and research. While AI systems can execute tasks efficiently, they are incapable of engaging with the moral dimensions of those tasks, which is necessary for making ethically sound decisions.

Additionally, Farisco et al. (2020) highlight another major ethical concern: AI's "black box" nature, referring to the lack of transparency in how AI systems generate results. The decisions made by AI are often difficult for even their developers to fully explain. This opacity, combined with AI's inability to reflect on its actions or to intentionally make morally informed choices, creates risks in decision-making processes, particularly in research ethics. If educators or researchers rely on AI without understanding how it reaches its conclusions, there is a potential for biased or flawed outcomes that remain unchecked. This raises questions about the validity of AI-generated conclusions, particularly in areas like ethics, where human intuition and reasoning traditionally play a central role.

Scholars therefore argue that while AI can automate and enhance various educational processes, it should not be entrusted with tasks requiring moral and ethical judgments. The limitations of AI—its lack of moral reasoning, transparency, and self-reflective capacity—must be acknowledged when integrating these technologies into education and research. Caution is essential to ensure that AI's contributions enhance education without undermining ethical standards, and that humans remain central to decision-making processes involving moral considerations.

Misinformation

AI is known for its 'black-box' aspect, where results are difficult to justify, and it is difficult to fully validate a model with certainty (Lenca and Ignatiadis, 2020) cited in Bouhouita-Guermech et al (2023). Deciding to monitor research participants closely

could help validate results which, in theory, would bring more accurate results. Essentially, close monitoring could also have a negative effect by influencing participants' decisions based on whether they mind being monitored or not. This event could, as a result, produce more inaccurate results (Jacobson et al., 2020). AI tools such as Chat GPT generate content without verifying the accuracy of information. What generative AI tools prompt produce as a response does not guarantee the validity of such information. And because these programs learn a lot about how people express themselves, most of their output will follow how human beings communicate in a very confident tone, even if it is wrong.

Academic Fraud

The rise of artificial intelligence (AI) has undoubtedly revolutionized educational and scientific research, offering significant advancements in data generation, analysis, and predictive modeling. AI's influence on academic learning, scientific discovery, and problem-solving is profound. However, this increasing reliance on AI introduces vulnerabilities, which dishonest researchers can exploit. Nair (2023) points out that while AI has the potential to accelerate scientific discoveries and analyze vast datasets, it also raises concerns about scientific misconduct and data manipulation. Such manipulation undermines the quality of educational research, distorts scientific credibility, and can lead to inaccurate findings, challenges in reproducibility, damage to scientific integrity, and poor decision-making.

A related issue is the use of AI tools like ChatGPT by students to complete assessments, which could impair their ability to conduct genuine educational research and foster academic dishonesty. AI-generated content, though convenient, runs the risk of spreading inaccurate or misleading information. Moreover, AI can generate sophisticated material that makes it challenging to trace false or misleading facts. This difficulty is compounded by the potential manipulation of references, where tracing the source of information and verifying its accuracy becomes nearly impossible.

High-profile examples of academic fraud involving AI misuse highlight the severity of these concerns. For instance, Ike Antkare managed to publish over 100 papers in a single year, propelling his name to the 21st position among the most cited scholars in the world, even surpassing Albert Einstein (Labbé, 2010; cited in El-Sayed, Sithara, Gamage, & Mils, 2019). Similarly, Philip Parker, using AI and automated systems, has authored 200,000 books sold on Amazon, producing a new book every twenty minutes through a patented process that combines internet and database searches. This type of AI-driven output raises serious questions about the integrity of authorship, as works generated by AI tools like text generators, paper generators, or thesis generators do not reflect the authentic work of their purported authors.

AI-generated content can also evade traditional plagiarism detection systems, making it difficult for educators and reviewers to identify academic and research misconduct. As El-Sayed et al. (2019) argue, detecting papers produced by AI requires a more rigorous approach from reviewers and educators to maintain academic integrity and prevent the erosion of trust in scientific and educational research.

Validity and Effectiveness

Another key ethical concern in educational research involving artificial intelligence (AI) is the validity and effectiveness of research outcomes. Bouhouita-Guermech et al. (2023) emphasize that validity is critical to understanding the normative implications of AI technologies in research. Ethical guidelines demand that researchers' protocols clearly outline essential elements, including the validation models and performance metrics, to allow for proper evaluation of the technology's practical applications (McCradden, Stephenson, & Anderson, 2020, cited in Bouhouita-Guermech et al., 2023). This transparency is essential for ensuring that AI-driven research can be applied effectively in educational contexts.

One major challenge associated with AI systems is their potential inconsistency across different sub-populations. As highlighted by McCradden et al. (2020), AI technologies may not function equally well for all groups, particularly across racial, ethnic, and other demographic lines. Thus, it is essential that AI systems are validated with diverse sub-populations to ensure fairness and accuracy in their application.

Another aspect of validity, as noted by Chassang, Thomsen, Sèdes, and Delfin (2021), concerns the explainability of AI-generated results. Deep learning, a subset of machine learning with more complex algorithms, can produce results that are difficult to interpret or explain. This opacity creates challenges for transparency, as it becomes harder for participants and researchers alike to understand how AI models arrive at specific conclusions (Grote, 2021). This lack of clarity raises concerns about the reliability and ethical use of AI in educational research, where explainability and accountability are crucial.

Privacy and confidentiality

Many AI developers rarely provide transparent information about the details of their training datasets. Generative AI systems often rely on data scraped from both public and private web pages, which are then packaged and used for AI development. There is a disproportionate emphasis on data privacy and governance, often overshadowing other ethical concerns. Busch (2023) notes that some AI developers use large, widely available datasets such as the "Colossal Clean Crawled Corpus" (C4) and "Common Crawl." These datasets are amassed through web crawling—software that systematically scans public internet sites to collect data. Similarly, AI image generators are frequently trained on LAION, a dataset containing billions of images and their accompanying text descriptions, scraped from the web (Newman & Cantrill, 2023). Furthermore, some models are trained on sensitive data, raising concerns about the potential for revealing personal information to users.

The ethical dilemma lies in the mass collection of data without proper consent, approval, or compensation to the original content creators or owners. This practice represents a significant breach of privacy and confidentiality. The issues of privacy, confidentiality, safety, and anonymity have been further exposed by the emergence of generative data, deepfakes, and machine learning. These concerns have narrowed the ethical debate surrounding AI, often focusing solely on data privacy while overlooking broader ethical issues like justice and fairness (Samuel & Gemma, 2021). This imbalance has led to the persistence of problematic practices, where privacy violations overshadow critical discussions on the responsible and just use of AI technologies.

Bias

Bias is a significant factor negatively impacting the development and deployment of AI systems. Ferrara (2023) highlights that bias involves systematic errors in decision-making processes, which can lead to unfair outcomes. In AI, bias can emerge in various stages, including data collection, analysis, interpretation, algorithm design, and human judgment. When biases are embedded in the analysis, they can compromise the objectivity and neutrality of educational research outcomes, potentially leading to distorted or unjust conclusions.

Ensuring transparency, rigor, and awareness of potential biases is crucial for maintaining the integrity of educational research and upholding ethical standards. Addressing biases is essential to preserve the credibility of educational research and foster ethical practices in education, technology, and science. The presence of bias in AI systems raises several ethical concerns in educational research, particularly the risk of discrimination against individuals or groups based on attributes such as race, gender, age, or disability (O'Neil, 2016, cited in Ferrara, 2023). AI systems learn from the data they are trained on, which means their outputs may reflect existing biases, leading to responses that are biased or incomplete and lacking in novelty or innovation.

Conclusion

The field of AI and educational research faces significant ethical challenges and needs, as evidenced in this chapter. The research has explored various aspects of AI ethics and general issues before delving into AI-specific ethical concerns in educational research. This investigation highlights the critical issues confronting educational research ethics, particularly during evaluations and the limitations imposed by AI ethics.

Despite the promising potential of AI, there are several caveats that necessitate a deeper understanding of these systems. The intersection of AI and educational research ethics requires careful consideration and proactive measures. As AI technologies become increasingly integrated into educational research, it is crucial to prioritize privacy, ensure data integrity, and promote transparency. Balancing innovation with ethical principles is essential for creating a responsible and equitable educational landscape in the digital era.

Ongoing collaboration among researchers, educators, and policymakers is vital for addressing the ethical challenges posed by AI in educational research. This collaboration will help ensure that AI's impact on learning outcomes and societal well-being is positive and aligned with ethical standards.

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