Ethical Considerations in Instructional Design Enhanced by Artificial Intelligence: A Systematic Literature Review

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Abstract
This systematic literature review explores the ethical considerations and challenges instructional designers face when integrating artificial intelligence (AI) into the instructional design process for adult learners. Using the Technological Pedagogical Content Knowledge (TPACK) framework to examine the relationship of ethics, pedagogy, and technology in educational contexts, considering the increasing usage of AI. Synthesizing data from peer-reviewed publications, qualitative research, and theoretical papers, the review examines the evolution and application of AI-driven instructional technologies, the ethical issues encountered, and how they affect the educational experiences of adult learners. Crucial topics identified include balancing ethical standards with technological advancements, ensuring learner privacy and data security, and mitigating biases in AI algorithms. The results highlight the need for transparency in AI applications and the ongoing need for professional growth to successfully negotiate the changing ethical environment. This review highlights significant gaps in the literature, including the lack of comprehensive ethical frameworks tailored for AI in adult education, the scarcity of long-term empirical studies on AI's impact, and the need for practical implementation strategies for instructional designers. Addressing these gaps is essential for enhancing the quality and integrity of AI-enhanced adult education. By focusing on stronger ethical frameworks and coordinated efforts among educators, technologists, and policymakers, this review intends to improve the quality and integrity of AI-enhanced adult learning.
Keywords: Artificial intelligence, ethics, ethical considerations, instructional technology

Introduction

The incorporation of AI into educational practices has the potential to transform instructional design, especially for adult learners with unique experiences and needs (Nguyen et al., 2023; Souli et al., 2024). As AI becomes more embedded in educational contexts, it is essential to study the ethical considerations and challenges that instructional designers confront in this changing environment (Chan, 2023; Dagman & de Licht, 2024). The purpose of this systematic literature review is to examine the ethical considerations surrounding AI-driven instructional technologies and their effects on the educational experiences of adult learners. This analysis will be conducted within the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006; Koehler et al., 2013).

Given their diverse backgrounds and unique learning requirements, ethical considerations must be considered when integrating AI into the instructional design process for adult learners (Chan & Hu, 2023). This review synthesizes data from various sources, such as theoretical papers, peer-reviewed articles, and qualitative studies, to offer a thorough analysis of the integration of AI in instructional design. Relevant issues covered in this study include the advancement and usage of instructional tools powered by AI, ethical challenges experienced by instructional designers, and the wider consequences for adult education (Holmes et al., 2023; Mouta et al., 2023).

The research identifies several significant themes, underscoring the critical need to balance technological advancements and ethical standards. This balance is essential to protect student privacy and data security, address potential algorithm biases, and ensure learner and educator autonomy in decision-making (Ferrara, 2024; Karan & Angadi, 2023; Mhlambi & Tiribelli, 2023). It is this delicate equilibrium that will pave the way for a responsible and ethical integration of AI in instructional design. The review emphasizes the importance of transparency in AI applications and ongoing professional development for instructional designers to effectively negotiate the ethical difficulties involved with AI (Nguyen et al., 2023; Holmes et al., 2023). Moreover, it underscores the value of including ethical considerations throughout the design and implementation processes to ensure the equitable and accountable deployment of AI in education (Chan, 2023).

Given the unique experiences and needs of adult learners, it is crucial to develop comprehensive ethical frameworks tailored to this demographic (Nguyen et al., 2023). The literature lacks empirical studies on the long-term impact of AI on adult learners, diverse cultural and socioeconomic contexts, and practical implementation

strategies for instructional designers (Ferrara, 2024; Karan & Angadi, 2023). This review aims to highlight these gaps and underscore the importance of addressing them to ensure the responsible integration of AI in adult education (Becker et al., 2023; Ortega-Bolaños et al., 2024).

This review strives to contribute to academic discussion while offering practical insights for instructional designers, educators, technologists, and policymakers (Holmes et al., 2023; Souli et al., 2024). By highlighting the importance of strong ethical frameworks and collaborative efforts, this study strives to improve the quality and integrity of adult education in the age of new and innovative technology. It highlights the importance of informed decision-making and responsible deployment of AI technology to enhance awareness of ethical aspects of AI integration and recommend areas for future study and development (Dagman & de Licht, 2024; Chan & Hu, 2023).

Review of Relevant Literature

Incorporating AI into education has shown great promise, particularly in enhancing instructional design and pedagogical methodologies. The rapid advancement of AI technology has generated new prospects for personalized learning and adaptable teaching methodologies, resulting in an increasing research focus on AI-enhanced education (Bates et al., 2020; Bearman et al., 2023; Strzelecki, 2024). It is critical to address the ethical issues linked to the use of AI in instructional design, particularly for adult learners who have different experiences and demands in the learning environment (Bond et al., 2024; Ferrara, 2024; Khreisat et al., 2024).

TPACK Framework and Ethical Considerations

Mishra and Koehler (2006) established the Technological Pedagogical Content Knowledge (TPACK) framework, which offers a helpful viewpoint on integrating technology, pedagogy, and topic knowledge into education. This approach is useful in comprehending the ethical implications of AI-enhanced instructional design, since it promotes a balanced interaction between these three areas of knowledge. In addition, the TPACK framework highlights the significance of aligning technological integration with pedagogical objectives and content accuracy, ensuring that ethical considerations are appropriately addressed in the pursuit of educational innovation.

Technological Knowledge (TK)

Technological Knowledge (TK) involves a thorough understanding of AI technologies' capabilities and limitations. It is crucial for instructional designers and educators to have an in-depth understanding of how AI systems collect, analyze, and leverage data. A firm grasp of AI's capabilities and limitations will help address ethical concerns like data privacy and algorithmic bias. Recognizing the potential for AI algorithms to inadvertently perpetuate biases enables educators to establish safeguards and promote more equitable AI applications (Ferrara, 2024; Karan & Angadi, 2023). In addition, it is crucial to prioritize data privacy, especially considering that adult learners may not be familiar with intricate data procedures. This highlights the importance of transparency and trust in educational institutions (Tzimas & Demetriadis, 2021).

Pedagogical Knowledge (PK)

Pedagogical Knowledge (PK) consists of teaching methods and instructional strategies. The application of AI to enhance tailored instruction raises important ethical considerations, particularly in relation to learner autonomy. The potential of AI to customize educational experiences according to individual needs must be balanced with the need to preserve learner autonomy (Chan, 2023; Mhlambi & Tiribelli, 2023). It is crucial to ensure that AI applications do not compromise the self-directed nature of adult learning. It is crucial to prioritize the development of AI tools that promote inclusive and equitable education practices in order to uphold an ethical pedagogical approach (Bond et al., 2024; Khreisat et al., 2024).

Content Knowledge (CK)

Having a deep understanding of the subject matter and adhering to ethical practices are essential for achieving proficiency in Content Knowledge (CK) when using AI to enhance content delivery. Ensuring content accuracy and impartiality is crucial since AI-driven educational content must be impartial and adapted to the requirements of varied learners. Effective ethical content design requires careful consideration of how AI algorithms generate and present information to prevent misinformation and promote educational fairness (Chen et al., 2023; Ntoutsi et al., 2020).

Gaps in the Literature

Although considerable research has been conducted on AI in education, there are still notable gaps that need to be addressed. Comprehensive ethical frameworks tailored to AI in adult education are absent, as are empirical studies examining the long-term effects of AI on adult learners (Nguyen et al., 2023; Souli et al., 2024). These studies are vital for gaining insights into the long-term impact of AI technologies on adult learners in various academic settings.

In addition, numerous studies fail to sufficiently account for the wide range of cultural and socioeconomic backgrounds among adult learners (Ferrara, 2024; Karan & Angadi, 2023). Many studies fail to adequately address the impact of these factors on the ethical considerations and effectiveness of AI integration in education. Addressing this gap is crucial to developing inclusive AI-driven instructional designs that meet the needs of all adult learners.

Additional research is needed to explore the practical implementation strategies for instructional designers and the effectiveness of professional development programs in addressing ethical issues (Becker et al., 2023; Ortega-Bolaños et al., 2024). There is a need to conduct research that offers clear guidelines and assesses professional development programs to ensure they equip instructional designers with the essential skills to address ethical challenges in AI. Furthermore, these strategies must be flexible and able to keep up with the ever-changing AI technologies. This will help instructional designers maintain their expertise and ethical standards as they face new challenges.

In addition, there is a lack of research in the areas where AI intersects with established pedagogical theories and the ethical considerations of AI data usage (Nguyen et al., 2023; Holmes et al., 2023). Crucially, looking at how artificial intelligence may be included in frameworks like TPACK while maintaining ethical standards is vital. Furthermore, research is needed on the ethical management of AI-generated data to protect student confidentiality and prevent misuse.

Conclusion

Integrating AI into the instructional design process conveys enormous potential for improving education, especially for adult learners. It is crucial to prioritize ethical considerations to ensure that new technologies enhance educational experiences rather than compromise them. Incorporating the TPACK framework into ethical discussions offers a comprehensive approach to comprehending and navigating these challenges.

This systematic literature review has identified several significant gaps in the existing research. More specifically, there is a noticeable gap in robust ethical frameworks specifically designed for artificial intelligence in the context of adult education. Furthermore, there is a lack of empirical research examining the long-term effects of AI on adult learners, as well as a scarcity of studies that consider varied cultural and socioeconomic circumstances. Additional research is needed to explore the practical implementation strategies for instructional designers and the effectiveness of professional development programs in addressing ethical issues (Becker et al., 2023; Ortega-Bolaños et al., 2024). Research is needed that offers clear guidelines and evaluates professional development initiatives to ensure they equip instructional designers with the essential skills to address ethical challenges in AI.

Furthermore, there is a need for further research in the areas where AI intersects with established pedagogical theories and the ethical implications of AI data usage. The existence of these gaps highlights the need for targeted research that addresses the specific difficulties encountered by adult learners in AI-enhanced educational environments. It is important to consider the development of AI systems that are adaptive and culturally responsive in order to effectively meet the diverse needs of adult learners.

This review seeks to enhance the quality and integrity of AI-enhanced adult learning by highlighting the significance of strong ethical frameworks and collaborative efforts among educators, technologists, and policymakers. Future studies should focus on developing tailored ethical guidelines, evaluating the effectiveness of current frameworks, and investigating methods to promote inclusive and equitable integration of AI in education. It is essential to address these gaps to promote responsible AI usage that respects the privacy, autonomy, and diverse needs of adult learners. This will ultimately contribute to more effective and ethically sound educational practices.

Enhanced Professional Development Recommendations:

Key recommendations for professional development have emerged to address ethical challenges in AI integration in education. In the initial phase, it is crucial to develop thorough and ethically sound AI training programs. These training and development programs should focus on the ethical application of AI in education, encompassing key ethical concepts, case studies of ethical considerations, and successful ways of tackling common ethical challenges. In this regard, a certification course titled "Ethical AI in Education" could be created, concentrating on issues involving data privacy, algorithmic bias, and ethical decision-making frameworks.

Addressing ethical challenges in AI integration in education requires a collaborative approach. Educators, technologists, ethicists, and legal professionals each bring their unique expertise to the table. Interdisciplinary workshops and seminars are key in promoting this collaboration and the exchange of effective strategies. An illustration of this would be establishing an annual seminar titled "AI Ethics in Education: Challenges and

Solutions." This series would showcase experts from many disciplines and incorporate interactive breakout sessions to foster conversation and the formulation of solutions.

Another important recommendation is to include ethical AI training in the ongoing professional development (CPD) requirements for educators and instructional designers. It is vital that these professionals stay current with the latest ethical guidelines and technological advancements. Providing CPD credits for certified ethical AI courses and seminars would help maintain professional certification and ensure continued expertise in navigating the challenges of integrating AI into the instructional environment.

Creating mentorship programs and peer support networks can also offer valuable guidance and support for educators and instructional designers who encounter ethical dilemmas. Experienced mentors could offer valuable insights from their experiences with AI in education, assisting new members in effectively understanding and addressing ethical concerns. An experienced instructional designer might give advice and share helpful materials with their less experienced colleagues through a peer mentoring network, which would be highly advantageous.

Another key recommendation is to establish online resource centers dedicated to ethical AI. These centers should provide access to up-to-date research, ethical guidelines, best practices, and training materials on AI in education. The development of an online platform, like the "Ethical AI in Education Hub," can offer professionals a variety of resources such as white papers, toolkits, webinars, and a discussion forum. This enables the exchange of ideas and encourages engaging discussions.

Finally, implementing regular ethics audits for instructional designers and educators can help them assess the ethical implications of their AI-driven tools and practices. These audits should be well-structured and offer helpful feedback on areas that can be enhanced. Instructional designers might evaluate their AI tools using an annual ethics audit checklist and improve to meet ethical standards.

Implementing these recommendations will enable instructional designers and educators to successfully address the ethical challenges of incorporating AI into education (Adams et al., 2023; Becker et al., 2023). Nevertheless, the existing research highlights several gaps in the discussion. Thorough research is lacking that assesses the effectiveness of existing ethical frameworks specifically designed for adult learners. Furthermore, further investigation is needed to develop strategies that effectively address the unique challenges experienced by adult learners in AI-enhanced educational settings. Existing frameworks frequently neglect the unique needs of adult learners, highlighting the need for tailored ethical guidelines to ensure fair and inclusive educational procedures (Becker et al., 2023; Ortega-Bolaños et al., 2024).

This review seeks to make a valuable contribution to academic discussions while also offering practical insights for instructional designers, educators, technologists, and policymakers. The intent of this literature review is to enhance the standard and honesty of adult education in the digital age by highlighting the importance of strong ethical frameworks and collaborative activities. Through ethically sound AI deployment and informed decision-making in educational contexts, this review is intended to broaden understanding of the ethical considerations of AI integration and identify areas that necessitate additional research and investigation.

Methodology

Research Design

This systematic literature review explores the ethical considerations and challenges associated with integrating AI in instructional design for adult learners. Ethical frameworks are analyzed and evaluated to determine their strengths and flaws and uncover research gaps. Providing useful insights for educators, technologists, legislators, and instructional designers may assist in enhancing the ethical application of artificial intelligence in educational settings (Mishra & Koehler, 2006; Nguyen et al., 2023).

This systematic literature review aims to thoroughly examine the ethical considerations and challenges related to integrating AI into instructional design for adult learners. A set of specific research questions guides it. These questions seek to explore the unique perspectives of instructional designers, examine the ethical challenges encountered with AI technologies, and evaluate the application of theoretical frameworks such as TPACK. By addressing these questions, the study aims to fully understand how AI may be ethically and effectively integrated into adult education while preserving technical progress and educational integrity. The research questions guiding this review are as follows:

1. What are the reported experiences and challenges faced by instructional designers when integrating AI into instructional design for adult learners?

2. What ethical challenges related to data privacy, algorithmic bias, and learner autonomy are highlighted in the literature on AI-enhanced instructional design for adult learners, and how are they being addressed?
3. How has the TPACK framework been applied in the context of AI-enhanced instructional design for adult learners, and what are the reported outcomes?
4. What strategies are documented in the literature for balancing AI technology integration, pedagogical quality, and content accuracy in the design of adult education courses?
5. What ethical guidelines for AI in instructional design are discussed in the literature, and how do they impact the motivation and utilization of AI technologies in adult education?

Database Search

A comprehensive search was conducted across several academic databases accessible through the Jerry Falwell Library at Liberty University, including ERIC, EBSCO Quick Search, JSTOR, and ProQuest. Additionally, the EBSCO eBook collection, eBook Central in ProQuest, and Google Scholar were used to ensure a thorough search. The search was restricted to peer-reviewed articles published between 2019 and 2024, available in full text, and published in English.

Initially, broad search terms were identified based on key concepts related to the research questions to ensure a comprehensive search. These terms included "Artificial Intelligence in education," "ethical considerations," "instructional design," "adult learners," and "TPACK framework." Recognizing the diverse terminology used in the literature, synonyms and variations for each key concept were identified. For instance, "AI-driven learning technologies" and "intelligent tutoring systems" were used as synonyms for "Artificial Intelligence in education," and "data privacy," "algorithmic bias," and "transparency in AI" were used for "ethical considerations."

Search terms were combined using Boolean operators (AND, OR) to ensure effective results. As an illustration, the search was refined by using "Artificial Intelligence in education" AND "ethical considerations" to ensure relevance. Additionally, synonyms and variations such as "AI in instructional design" OR "AI-driven learning technologies" were included to ensure thoroughness. The search phrases and combinations were optimized repeatedly using pilot searches and feedback loops. If a search for "AI in adult education" generated too many irrelevant results, it was coupled with more specific terms such as "ethical considerations" or "data privacy."

Each database's unique search options were used, and search terms were adjusted accordingly. ERIC and JSTOR used subject-specific thesaurus and indexing words, whereas ProQuest used sophisticated search tools such as proximity searching and wildcard characters. Furthermore, Boolean operators were used deliberately to narrow search results, ensuring the search was thorough and focused on relevant research.

Inclusion and Exclusion Criteria

Certain inclusion and exclusion criteria were used to ensure relevance and quality. The inclusion criteria specified that research findings needed to be peer-reviewed academic articles focusing on instructional designers in higher education. These articles should also discuss AI technology and ethical issues in adult education. Furthermore, they should have been published in English between 2019 and 2024. Studies were excluded that were not peer-reviewed, unrelated to AI in education, conducted in non-educational settings, involving non-adult learners, or unavailable in full text online.

Data Extraction

The data extraction process was carried out with great attention to detail and a systematic approach, involving multiple steps to ensure precise and consistent results. Data were extracted from each study using a standardized data extraction form, capturing fields such as study ID, title, authors, year of publication, study objectives, population (adult learners), AI technologies used, ethical considerations discussed, theoretical frameworks (e.g., TPACK), key findings, and limitations. On this form, the fields for population and theoretical framework were both pre-selected to reflect that only adult learners were used in this research and that TPACK was the framework used as the foundation for this study. This standardized approach allowed for efficient organization and data comparison from various studies. This approach facilitated an exhaustive summary of findings, ensuring that all important information was considered.

Following the initial extraction, a thorough self-verification process was conducted. This involved carefully reviewing the extracted data compared to the original studies to identify and address any discrepancies. The extracted data were also compared with established guidelines and frameworks relevant to AI in education and ethical considerations, including the TPACK framework and other ethical principles in AI usage. In addition, this step ensured a consistent interpretation and reporting of ethical considerations and AI applications across various studies.

Although I was the sole reviewer, seeking input from colleagues or advisors added another level of review, which helped confirm the accuracy of the extracted data and resolve any inconsistencies. All discrepancies were carefully recorded, noting the specific details of each discrepancy and the actions taken to address and resolve them. A thorough review was conducted to ensure consistency and accuracy throughout the data collection.

Quality Assessment

The studies were evaluated using the Critical Appraisal Skills Programme (CASP) checklists to determine their quality. This systematic strategy ensured a consistent evaluation of each study's accuracy, relevance, and methodological quality. CASP is frequently used in qualitative research and systematic literature reviews to thoroughly evaluate studies, offering a strong framework for identifying the strengths and weaknesses in research methodology and reporting (Long et al., 2020).

Due to being the sole reviewer, the usual methods of assessing inter-rater reliability were not applicable. Instead, the quality assessment entailed doing a preliminary evaluation on a selection of articles using CASP checklists to detect and address any uncertainties in the appraisal criteria. Thorough documentation was kept for each study, including observations on how each study aligned with or deviated from appraisal criteria. Peer consultation was instrumental in receiving valuable feedback on the appraisal criteria and process. Reflective practice performed a key role in identifying and addressing any potential biases.

Data Synthesis

Braun and Clarke (2022) described thematic analysis as guiding the synthesis of qualitative data. The process started by becoming thoroughly familiar with the collected data. This involved reading and re-reading the articles, making initial notes, and recording potential themes. The Atlas.ti software enabled systematic coding of important features throughout the dataset, allowing for a thorough material analysis.

After the coding process, the various codes were grouped together into larger themes. The visual mapping tools available within Atlas.ti were used to effectively organize and streamline the thematic structure. The identified themes were carefully examined and improved to ensure they correctly represented the data and were relevant to the overall dataset. Precise definitions and names were established for each subject, enabling consistency and clear data representation.

Finally, a comprehensive report was created, using specific examples from the data to demonstrate each theme. In addition to providing insightful information about the ethical issues surrounding the integration of AI into instructional design for adult learners, this narrative offered a clear and compelling overview of the themes discovered during the study. The report effectively showcased the key findings by incorporating specific examples and case studies. Additionally, it provided valuable insights into the practical implications and real-world applications of these ethical considerations.

Results

Overview of Selected Studies

The final literature review included 42 articles with various focuses and scopes. Specifically, 5 studies addressed AI in education, 5 explored ethical considerations related to AI in education, 5 examined AI in education for adult learners, 6 discussed the TPACK framework and AI in education, 6 addressed AI-driven tools and technologies, 3 investigated data privacy, 3 investigated algorithmic bias, and 2 explored transparency issues. The research articles were published between 2019 and 2024, offering a current perspective on the subject matter. The study encompassed a variety of research methods, including qualitative, quantitative, mixed methods, and theoretical concept papers. The studies covered various locations including the United States, Europe, the Middle East, North Africa, and specific countries like Iran and Ghana. This variety enhances the depth and practicality of the research on ethical considerations in AI-enhanced instructional design.

Key Themes Identified

During the analysis of the selected studies, several key themes were identified, which closely align with the research questions and objectives of the systematic literature review. A predominant theme in the literature was the ethical considerations of AI, with several studies highlighting the value of ethical guidelines for integrating AI into educational environments. These principles included data privacy, algorithmic bias, transparency, and the need for ethical guidelines (Adams et al., 2023; Ahmad et al., 2023; Airaj, 2024; Aiken & Epstein, 2000; Ashok et al., 2022). These ethical considerations are crucial for ethical AI implementation and learner rights and privacy.

Another important issue was AI's transformative potential in education. Several articles explored AI's potential to enhance personalized learning, boost student engagement, and address the ethical and practical challenges

associated with the implementation of new technologies (Adiguzel et al., 2023; Bearman & Ajjawi, 2023; Bearman et al., 2023; Bates et al., 2020; Berendt et al., 2020). The studies emphasized the potential advantages of AI, including the ability to tailor learning experiences and enhance student involvement. This underscores the importance of maintaining a balance between innovation and ethical concerns.

The TPACK framework was a prominent topic of discussion. Multiple articles have examined the significance and practicality of incorporating technology into educational instruction and learning (Asamoah, 2019; Bagheri, 2020). The TPACK framework assists educators in understanding the effective integration of technology into their teaching practices, with a continued emphasis on pedagogy and content knowledge.

Another important theme explored was the unique obstacles and challenges adult learners encounter. The studies focused on various challenges adult learners face, including time constraints, financial difficulties, and the need to balance education with other responsibilities. The research also proposed strategies to provide support and assistance to these learners throughout their educational journey (Bellare et al., 2022). Addressing these challenges is crucial in developing AI-enhanced instructional materials that meet the specific requirements of adult learners.

The importance of AI literacy and pedagogical appropriateness was also emphasized in the literature. Ensuring that AI tools are designed and used in ways that are instructionally sound and ethically responsible is crucial *(*Adams et al., 2023; Akgun & Greenhow, 2022). It is imperative for educators to possess the necessary knowledge and skills to effectively and ethically adopt AI tools and technologies.

Many of the reviewed studies highlighted qualitative research methodologies. These methodologies, including thematic analysis and hermeneutic phenomenology, highlight the significance of comprehending the real-life experiences of instructional designers and learners (Alsaigh & Coyne, 2021; Braun & Clarke, 2019, 2023). These themes support the value of addressing ethical challenges, appreciating the unique needs of adult learners, and using strong qualitative techniques to obtain greater insight.

Specific Examples Illustrating Each Theme

Ethical considerations were a major focus in the literature. Adams et al. (2023) noted that "the study found that many core principles such as Transparency, Justice and Fairness, Non-maleficence, Responsibility, Privacy, Beneficence, and Freedom & Autonomy are adapted for children" (p.100131). Ashok et al. (2022) discussed "key ethical principles such as intelligibility, accountability, fairness, autonomy, and privacy" (P.102433). These studies emphasize the essential ethical principles required for the responsible incorporation of AI in education.

In their study, Adiguzel et al. (2023) conducted a thorough examination of the various ways in which ChatGPT, and similar AI technologies can be applied in the field of education. In a recent study conducted by Ahmad et al. (2023), noteworthy findings were uncovered regarding the adverse effects of AI. These adverse effects include a 68.9% increases in laziness, a 68.6% increase in privacy concerns, and a 27.7% decline in decision-making capabilities. The findings highlight the importance of carefully assessing the potential impacts of AI technologies in education.

Data privacy is another critical theme that was discussed in the literature. Ahmad et al. (2023) supported the implementation of proactive strategies and conscientious integration of artificial intelligence in education to address privacy concerns. Aiken and Epstein (2000) outlined "ten specific ethical principles for AI in education, such as avoiding information overload, promoting inquisitiveness, and respecting cultural diversity" (P.171). These studies highlight the need to protect learner data and implement secure data management strategies.

Baker and Hawn (2022) examined algorithmic bias, focusing on biases pertaining to race/ethnicity, gender, and nationality. The proposed framework for addressing algorithmic bias emphasized "recognizing and mitigating bias throughout the AI lifecycle, from data collection to deployment" (Baker and Hawn, 2022, p.1052). This theme highlights the importance of ensuring equitable educational outcomes through responsible application of AI.

The challenges and barriers faced by adult learners were discussed by Bellare et al. (2022) and Lin (2024). In their study, Bellare et al. (2022) identified several key themes that shed light on the experiences of adult learners. These themes encompassed various barriers that adult learners face, such as time constraints, financial concerns, and lack of preparedness. On the other hand, the study also highlighted motivations that drive adult learners, including career advancement, skill development, and personal fulfillment (Lin, 2024). The findings highlight the importance of creating learning environments that provide support and cater to the specific and unique needs of adult learners.

Asamoah (2019) expanded upon the TPACK framework by integrating "Ethics" and "Accomplishment" into the existing framework. Bagheri (2020) emphasized the need for ensuring that technological integration remains in line with pedagogical goals and content accuracy. These articles demonstrate the TPACK framework's relevance and value in incorporating technology into teaching and learning. Adams et al. (2023) emphasized the importance of transparency in their article, highlighting its open-access nature and broad accessibility. In their study, Becker et al. (2023) highlighted the significance of the Code of Digital Ethics (CoDE) as a valuable instrument for ethical contemplation, assessment, and decision-making. They emphasized that its implementation could contribute to increased transparency and trust with external collaborators. These results emphasize the need of transparency in AI usage in educational settings.

Sub-Themes Identified

Several sub-themes were identified within the main themes, offering a more nuanced understanding. Understanding and addressing biases in the AI lifecycle is crucial for promoting fair educational outcomes, as emphasized by Baker and Hawn (2022). Protecting learner data and ensuring secure data handling practices are critical, as discussed by Ahmad et al. (2023). Adams et al. (2023) emphasize the significance of transparent and responsible usage of AI in educational environments. Ashok et al. (2022) explored the topic of ethical frameworks specifically designed for educational settings.

Designing effective AI-enhanced instructional materials requires consideration of the various challenges and motivations of adult learners. This was specifically discussed by Bellare et al. (2022) and Lin (2024). Adiguzel et al. (2023) highlights the importance of providing educators with comprehensive training and support to successfully incorporate AI into their teaching practices. Ensuring AI tools align with educational goals without undermining the educational process is crucial, as highlighted by Adams et al. (2023).

The sub-themes presented here serve to expand upon the main themes and offer a broad framework for understanding the ethical aspects of AI-enhanced instructional design. This systematic approach allows an in-depth examination of how AI technologies might be responsibly and effectively incorporated into educational environments for adult learners. This framework ensures that the integration of AI in education promotes fairness, equity, and transparency by addressing specific ethical considerations, such as data privacy, algorithmic bias, and the balance between AI and human interaction.

Synthesis of Findings

The studies examined in this review focus on the ethical aspects of AI in instructional design for adult learners. They highlight the importance of transparency, fairness, privacy, and the establishment of ethical guidelines. For example, Adams et al. (2023) and Ashok et al. (2022) highlight the importance of transparency and accountability in AI applications, advocating for systems that are understandable and monitored by users. In their study, Ahmad et al. (2023) emphasizes the importance of data privacy and put forth strong measures for data protection. Baker and Hawn (2022) examine strategies to address algorithmic bias and promote fairness and equity. These ethical considerations are crucial for responsible AI integration in education.

Instructional designers often encounter a range of challenges, including ethical considerations like bias, data privacy, and the need for transparency, along with technical and implementation issues. To properly apply artificial intelligence technology, instructional designers also have challenges merging AI with pedagogical goals and need continuous development and support. In addition, they must navigate the intricate challenges of creating inclusive and equitable learning environments that effectively address the varied needs of adult learners. These challenges highlight the complexity of integrating AI into instructional design and the need for comprehensive strategies to address ethical, technical, and pedagogical issues.

The application of the TPACK framework in the context of AI-enhanced instructional design for adult learners has been discussed in several studies. Asamoah (2019) and Bagheri (2020) have found positive outcomes in their research. They discovered that educators' technological and pedagogical knowledge improved, leading to enhanced learning experiences for adult learners. These examples illustrate how the TPACK framework may effectively manage the incorporation of technology into teaching and learning, while also prioritizing pedagogy and topic knowledge.

The strategies outlined for achieving an effective integration of AI technology while upholding pedagogical excellence and accuracy involve prioritizing ethical principles and human-centered design, promoting professional development and collaboration, addressing algorithmic bias and ensuring fairness, customizing instructional approaches, safeguarding data privacy and security, incorporating theoretical frameworks like TPACK, and actively engaging learners to foster critical thinking. The strategies outlined here focus on achieving an orderly

integration of AI technologies while upholding rigorous pedagogical standards and ensuring content accuracy. In addition, they emphasize the importance of consistently evaluating and improving AI tools to keep up with changing educational needs and technological advancements.

The literature extensively addresses the ethical guidelines for AI in instructional design, covering transparency and accountability, privacy and data security, fairness and bias mitigation, and a focus on human-centric AI. The guidelines have a significant impact on the motivation and usage of AI technologies in adult education. They promote trust, address privacy concerns, ensure fairness, promote human-centric approaches, and enhance professional development. These guidelines encourage the effective and ethical use of AI tools, fostering a wider acceptance and integration of AI into adult learning contexts.

Gaps and Limitations

The selected studies have highlighted various gaps and limitations that need to be addressed. These include the absence of empirical studies examining the long-term effects of AI on adult learners, the importance of considering diverse cultural and socioeconomic contexts, the lack of practical implementation strategies for instructional designers, and the limited assessment of the effectiveness of professional development programs. In addition, there is a need for further exploration into the integration of AI with established pedagogical theories and the ethical implications of AI data usage. This article highlights the importance of addressing these gaps to gain a better understanding of the ethical considerations in AI-enhanced instructional design for adult learners. By doing so, we can work towards creating more effective and equitable educational practices.

Additional Insight

The selected literature revealed several surprising discoveries, including the positive effects of AI-driven tools on learner engagement and motivation, the widespread acceptance of AI among adult learners, and the varying approaches to addressing ethical concerns in different studies. This study enhances our understanding of the intricate process of incorporating AI into instructional design for adult learners. It also sheds light on specific areas that demand additional research and attention. In addition, the uneven availability of AI tools in various educational institutions highlights the importance of fair resource distribution to ensure that all learners can take advantage of AI advancements.

The findings of this review align with the existing literature on the topic, reinforcing the need for ethical frameworks, transparency, and rigorous methodological practices. The consistency of these themes across multiple studies suggests a shared understanding and approach to addressing the challenges and opportunities posed by AI in instructional design. By synthesizing these findings, this review provides valuable insights for educators, instructional designers, and policymakers, promoting responsible AI integration in education.

Discussion

Interpretation of Results

This systematic literature review uncovers various key themes and sub-themes related to integrating AI in instructional design, with a specific emphasis on ethical considerations for adult learners. After analyzing 42 articles, it became clear that ethical considerations play a crucial role in the responsible implementation of AI in educational contexts (Adams et al., 2023; Ahmad et al., 2023; Ashok et al., 2022). These considerations include data privacy, algorithmic bias, and transparency. The transformative potential of AI highlights the importance of maintaining a balance between innovation and ethical guidelines. This technology can personalize learning and enhance engagement, making it a powerful tool (Adiguzel et al., 2023; Bearman & Ajjawi, 2023; Berendt et al., 2020).

The TPACK framework's significance in AI-enhanced instructional design was confirmed, demonstrating the need for educators to effectively integrate technology with pedagogical and content knowledge (Asamoah, 2019; Bagheri, 2020). In addition, the challenges encountered by adult learners, such as balancing education with other obligations and financial limitations, highlight the importance of tailored support systems and AI tools that address these distinct barriers (Bellare et al., 2022; Lin, 2024). By addressing these issues with thoughtfully designed AI solutions, educational settings may become more accessible and inclusive, which will eventually improve adult learners' learning outcomes.

Implications of Findings

This review's findings indicate that incorporating AI into instructional design needs a robust ethical framework to safeguard learner rights and advance fair educational results. Adhering to ethical norms that prioritize transparency, fairness, privacy, and accountability is essential to minimize any adverse effects, such as heightened indolence, diminished decision-making abilities, and privacy concerns that have been highlighted in certain research (Ahmad

et al., 2023; Aiken & Epstein, 2000). In addition, these ethical standards have the potential to create a learning environment that is more trusting and productive. This, in turn, can lead to greater acceptance and effective application of AI technologies by educators and learners.

The favorable response to AI among adult learners and its ability to increase engagement and motivation suggest a promising chance for AI-driven tools to improve educational experiences (Ahmad et al., 2023; Adiguzel et al., 2023). Nonetheless, educators must engage in ongoing professional development to successfully incorporate and utilize AI technologies while upholding ethical standards (Adams et al., 2023; Akgun & Greenhow, 2022).

Contextualizing with Existing Research

The results are in alignment with existing literature that highlights the importance of ethical AI frameworks and the transformative power of AI in education. Research conducted by Bearman et al. (2023) and Berendt et al. (2020) supports the importance of ethical considerations and the transformative potential of AI in the field of education. Furthermore, it is essential to prioritize continuous professional development and training for educators to ensure the effective utilization of AI within the TPACK framework. This will help to maximize the benefits of AI while minimizing potential risks.

Addressing Research Questions

The research questions guiding this review are as follows:

1. What are the reported experiences and challenges faced by instructional designers when integrating AI into instructional design for adult learners?
2. What ethical challenges related to data privacy, algorithmic bias, and learner autonomy are highlighted in the literature on AI-enhanced instructional design for adult learners, and how are they being addressed?
3. How has the TPACK framework been applied in the context of AI-enhanced instructional design for adult learners, and what are the reported outcomes?
4. What strategies are documented in the literature for balancing AI technology integration, pedagogical quality, and content accuracy in the design of adult education courses?
5. What ethical guidelines for AI in instructional design are discussed in the literature, and how do they impact the motivation and utilization of AI technologies in adult education?

Research Question 1: Experiences and Challenges of Instructional Designers

Integrating AI into instructional design for adult learners poses several challenges that instructional designers must navigate. The challenges involved in this field include technical challenges, the need to align AI tools with pedagogical goals, and the necessity of addressing the unique needs of adult learners who often balance education with other responsibilities (Bearman & Ajjawi, 2023). The literature emphasizes the importance of instructional designers staying up-to-date with AI advancements and effectively integrating them into their work (Adiguzel et al., 2023). Furthermore, the wide range of AI tools and their functionalities pose a considerable challenge, requiring designers to possess the skill of choosing and adapting tools to suit educational settings (Ahmad et al., 2023).

Research Question 2: Ethical Challenges and Mitigation Strategies

The ethical challenges related to AI-enhanced instructional design are substantial and complicated. Data privacy concerns are of utmost importance, as indicated by numerous studies that underscore the need for strong data protection measures (Ahmad et al., 2023; Aiken & Epstein, 2000). Researchers have highlighted the significant concern of algorithmic bias, emphasizing that unfair educational outcomes can result from biases in AI algorithms (Baker & Hawn, 2022). The literature recommends the implementation of ethical frameworks that prioritize transparency, fairness, and accountability to address these challenges (Adams et al., 2023; Ashok et al., 2022). The authors suggest implementing strategies like conducting regular audits of AI systems and adopting inclusive data practices to address biases and promote fair treatment of all learners (Akgun & Greenhow, 2022).

Research Question 3: Application and Outcomes of the TPACK Framework

The TPACK framework has been effectively applied in AI-enhanced instructional design, showcasing its effectiveness in integrating technological, pedagogical, and content knowledge (Asamoah, 2019; Bagheri, 2020). The framework helps educators in understanding how they can incorporate AI tools in an approach that aligns with their pedagogical objectives and improves content delivery. The reported outcomes highlight the positive impact of the study, showcasing how educators have improved their technological proficiency and adult learners have had enhanced learning experiences (Bagheri, 2020). Research suggests that the TPACK framework is effective in finding an appropriate balance between technological integration and pedagogical effectiveness. TPACK ensures that AI tools are used to support educational objectives rather than hinder impede progress (Asamoah, 2019).

Research Question 4: Balancing AI Integration with Pedagogical Quality

A strategic approach that encompasses professional development, collaboration, and continuous evaluation is necessary to balance the integration of AI technology with pedagogical quality and content accuracy (Bearman et al., 2023; Berendt et al., 2020). The literature examines various strategies, which includes developing a culture of continuous development for educators, promoting collaboration between AI experts and instructional designers, and developing tailored instructional approaches that align with educational objectives (Bellare et al., 2022; Lin, 2024). Incorporating theoretical frameworks like TPACK is crucial to ensure that the integration of AI tools maintains pedagogical integrity and content accuracy (Bagheri, 2020).

Research Question 5: Ethical Guidelines and Their Impact

Establishing ethical principles for AI in instructional design is necessary to ensure proper technology implementation and foster positive educational outcomes. The guidelines discussed in the literature emphasize the importance of transparency, accountability, fairness, and privacy (Adams et al., 2023; Ashok et al., 2022). These guidelines have a significant impact on the motivation and application of AI technologies. They attempt to foster trust among educators and learners, address privacy concerns, and ensure equitable access to AI tools (Airaj, 2024). The literature suggests that adhering to ethical guidelines can result in greater acceptance and more effective integration of AI in educational environments, ultimately improving the learning experience for adult students (Adams et al., 2023).

Limitations of the Review

Despite the comprehensive nature of this review, several limitations should be acknowledged. First, the review focused solely on articles published between 2019 and 2024, which may have overlooked earlier studies that could have offered valuable historical context and longitudinal data. In addition, it is worth considering that the emphasis on English-language publications may have unintentionally overlooked valuable research conducted in non-English-speaking regions. Such research could provide a range of perspectives and valuable insights into the ethical implications of AI within various cultural and educational settings.

Another limitation is the inconsistency in how ethical considerations are addressed in different studies. While some studies thoroughly explored issues such as data privacy, algorithmic bias, and transparency, others merely touched upon these concerns without delving into detailed analysis or offering practical solutions. The lack of consistency in this situation emphasizes the importance of implementing standardized ethical guidelines and frameworks that can be universally applied. This will help ensure a consistent approach to integrating ethical AI in education.

Furthermore, the review heavily relied on qualitative research methodologies. Although these methodologies offer detailed and insightful information, they may not be as easily generalized as quantitative studies. The overemphasis on qualitative studies may have biased the findings towards subjective interpretations of ethical issues and instructional challenges, potentially overlooking broader trends that could be uncovered through quantitative research. In many of the qualitative studies, there is a reliance on self-reported data. This could introduce biases, as participants' perceptions and experiences may not fully capture the objective realities of AI integration in instructional settings.

Lastly, the evaluation lacked a thorough analysis of the implementation and practical application of suggested ethical frameworks in actual educational settings. Empirical studies are necessary to assess the practical usefulness of these frameworks. These studies should offer actionable insights and evidence-based suggestions for instructional designers and instructors. Considering these limitations in future research would improve the strength and relevance of the findings, leading to a deeper understanding of ethical AI integration in instructional design for adult learners.

Future Research Directions

Future research should focus on longitudinal studies to understand the long-term effects of AI on adult learners, especially regarding ethical considerations. Longitudinal research provides an in-depth understanding of how AI impacts learning pathways, cognitive development, and career outcomes over extended periods of time. These types of studies play a crucial role in uncovering the various outcomes of AI integration, enabling us to make informed decisions and develop effective practices and policies (Ahmad et al., 2023; Ashok et al., 2022).

In addition, it is crucial to conduct research that examines how AI can be integrated with established pedagogical theories. Integrating AI with frameworks like TPACK can provide valuable insights into developing technology-enhanced learning environments that uphold pedagogical integrity. It is important to recognize the potential of AI tools in enhancing the instructional design process and accommodating different learning styles, which can ultimately lead to a more inclusive and flexible education system (Asamoah, 2019; Bagheri, 2020). In addition,

exploring the relationship between AI technologies and traditional teaching methods can provide valuable insights into how AI can be used to improve critical thinking, problem-solving, and collaborative learning for adult learners.

It is important for research to explore the practical application of ethical guidelines in different educational settings. It is important to not only create strong ethical frameworks, but also to put them to the test in real-life situations to ensure their practicality and effectiveness. Research could explore a range of cultural and socioeconomic settings to gain insights into how contextual factors impact the ethical incorporation of AI in education (Aiken & Epstein, 2000; Airaj, 2024). Meanwhile, it is crucial to thoroughly examine the effectiveness of professional development programs in equipping educators with the necessary skills to integrate AI ethically.

Empirical studies are required to assess existing training programs, identify any deficiencies, and suggest enhancements. Professional development models like continuous learning and collaborative training could be examined to determine the best way to prepare educators for AI-enhanced instructional design (Adiguzel et al., 2023). Understanding how these programs may be adapted to adult learners' requirements and AI's ethical problems will enable educators to properly and successfully use AI tools.

By addressing these gaps, future research can help us gain a deeper understanding of how AI can be integrated into instructional design in a responsible and effective manner. By prioritizing the rights and well-being of all learners, we can ensure that technology is used in a way that promotes equitable and effective educational practices. This approach, supported by research (Bearman & Ajjawi, 2023; Berendt et al., 2020), will benefit students and safeguard their educational experience. Future research should explore methods to enhance the accessibility of AI technology for educational institutions that lack resources in order to address inequalities and foster educational fairness among diverse areas and populations (Bellare et al., 2022; Lin, 2024).

Conclusion

This systematic literature review (SLR) offers a thorough analysis of the ethical considerations surrounding AI-enhanced instructional design, specifically focused on adult learners. The review covered 42 articles that explored a wide range of topics, including ethical challenges, the use of AI in adult education, the application of the TPACK framework, and ways to balance AI technology with pedagogical quality. The findings emphasize the importance of robust ethical frameworks to ensure the responsible integration of AI, focusing on ethical standards such as transparency, fairness, privacy, and accountability (Adams et al., 2023; Ashok et al., 2022).

The review highlighted the considerable advantages of AI in education, including personalized learning and enhanced student engagement. It also underscored the ethical and practical hurdles of implementing AI (Adiguzel et al., 2023; Bearman & Ajjawi, 2023; Berendt et al., 2020). The TPACK framework has become a crucial tool in the integration of technology with pedagogical and content knowledge, highlighting its continued importance in AI-enhanced instructional design (Asamoah, 2019; Bagheri, 2020).

The research highlighted the unique challenges encountered by adult learners, including the need to balance education in conjunction with other responsibilities and financial limitations. Addressing these challenges through tailored support systems and AI tools is crucial for enhancing adult education (Bellare et al., 2022; Lin, 2024). The need of AI literacy and continuous professional growth for educators has been identified as essential criteria for effective AI integration (Adams et al., 2023; Akgun & Greenhow, 2022).

Despite the insights collected, this study has limitations, including concentrating on current literature (2019-2024) and relying solely on English-language publications, which may leave out valuable previous research and non-English viewpoints. In addition, the disparity in how ethical concerns are addressed in different studies highlights the importance of having standardized ethical guidelines. Furthermore, the emphasis on qualitative and theoretical research underscores the need for additional empirical studies to support the findings and establish a stronger evidence base for the ethical integration of AI in instructional design.

Future research should prioritize longitudinal studies to gain insight into the lasting effects of AI on adult learners, with a specific emphasis on ethical considerations. This field will be enriched by exploring the integration of AI with established pedagogical theories and the practical implementation of ethical guidelines in diverse educational contexts. Furthermore, it is crucial to assess the effectiveness of professional development programs in equipping educators with the requisite skills to incorporate AI (Adiguzel et al., 2023) ethically.

By addressing these gaps, future research has the potential to enhance our understanding of how AI can be integrated into instructional design in a responsible and effective manner. This will ensure that all learners can benefit from the technology while protecting their rights and well-being. This SLR provides a solid foundation for

the development of ethical frameworks and practical strategies to integrate AI into adult education. It aims to promote fairness, equity, and transparency in educational practices.

Recommendations

This systematic literature review highlights the importance of having comprehensive and standardized ethical guidelines for the integration of AI in education. The range of approaches in addressing ethical concerns across different studies underscores the significance of establishing precise guidelines that prioritize transparency, data privacy, fairness, and accountability. This set of guidelines will establish a cohesive structure for the ethical usage of AI in educational environments (Adams et al., 2023; Ahmad et al., 2023).

Also, extensive research that extends over time and relies on real-world data is important to fully understand the lasting effects of AI on adult learners and the adult learning process. While theoretical and qualitative studies provide valuable insights, empirical research is essential to validate these findings and offer a robust evidence base. Longitudinal studies can show how AI-driven instructional strategies affect adult learners over extended periods (Bellare et al., 2022; Lin, 2024). Further research is needed to explore the integration of AI with established pedagogical frameworks, like TPACK. Having a grasp on how AI can assist various teaching methods and accommodate different learning preferences is crucial for fostering inclusive and flexible educational settings. By examining the intersection of AI and pedagogy, future studies can offer valuable insights into technology-enhanced learning practices that uphold pedagogical integrity (Asamoah, 2019; Bagheri, 2020).

Continuing education for educators is essential for ensuring the ethical and efficient incorporation of AI into instructional design. Training programs should be designed to equip educators with the necessary skills to navigate the complexities of AI-enhanced learning environments. By engaging in continuous learning opportunities and participating in collaborative training sessions, educators and instructional systems designers can ensure they stay updated with the latest advancements in AI and ethical standards. This will greatly enhance their ability to responsibly integrate AI tools into their teaching practices (Adiguzel et al., 2023).

Focusing on future research and practice is crucial to effectively meeting the specific needs of adult learners. AI tools and instructional strategies should be customized to support adult learners in managing their educational pursuits and other life obligations. Research should prioritize the development of inclusive learning environments that address the unique challenges and motivations of adult learners, ensuring that AI-enhanced education is accessible and impactful (Bellare et al., 2022; Lin, 2024).

Ensuring data privacy and security is of utmost importance when it comes to ethically incorporating AI in education. Implementing strong privacy measures is crucial to safeguard learner data and foster confidence in AI systems. Implementing proactive strategies and conscientiously integrating AI technologies can effectively address privacy concerns, maintaining the security and ethical use of learner information (Ahmad et al., 2023; Aiken & Epstein, 2000). By implementing transparent data practices and conducting regular privacy audits, we can further enhance our security measures. This will reassure learners and educators that their data is handled with the utmost care and integrity.

It is crucial to address algorithmic bias to guarantee fair educational outcomes. It is essential to implement frameworks that can identify and address biases at every stage of the AI lifecycle. Consistently monitoring and fine-tuning AI systems can be crucial in mitigating biases associated with race, gender, and other demographic factors. This proactive approach fosters a sense of fairness and equality in AI-powered education (Baker & Hawn, 2022). Ultimately, these recommendations illustrate the importance of implementing broad and diverse strategies to promote the ethical integration of AI in instructional design. In order to create strong frameworks that can adapt to the changing landscape of AI in education, it will be essential to promote collaboration among educators, technologists, policymakers, and ethicists.

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