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A systematic literature review of AI, education, and change in radiology practice

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Abstract

Radiology is undergoing a role change as Artificial Intelligence (AI) becomes increasingly embedded in clinical workflows, reshaping the roles, responsibilities, and educational needs of radiologists. As professionals known for their autonomy and expertise, radiologists face significant transitions that require effective change management and educational support. The systematic literature review is guided by the PRISMA methodology and synthesizes findings from peer-reviewed research between 2019 and 2024 to explore how AI integration influences radiology practice and training. Anchored in the GrandFusion Framework—a novel theoretical synthesis of Dewey's Experiential Learning, Simon's Bounded Rationality, Lewin's Change Management, Davis's Technology Acceptance Model, and Rogers's Diffusion of Innovations—this review categorizes AI applications, change management strategies, and educational interventions that support radiologists during this period of technological change. The study identifies six key thematic areas and highlights the growing impact of AI in radiology. It emphasizes the need for targeted change management and education to bridge the gap between technology and practice. By identifying trends and research gaps, this study offers valuable insights for practitioners and Information Systems (IS) researchers, concluding with recommendations for future research.

Keywords: artificial intelligence, radiology, education, technology adoption, AI in healthcare, change model

Introduction

The integration of Artificial Intelligence (AI) in radiology has triggered a significant transformation in the methodology and delivery of diagnostic imaging. AI technologies, especially those employing deep learning (DL) and machine learning (ML), augment diagnostic precision, optimize workflow efficiency, and enable radiologists to concentrate on more intricate and crucial responsibilities. As AI tools such as decision support systems gain prominence, it is critical to integrate education into change management efforts to influence AI acceptance and adoption. This literature review examines the present condition of artificial intelligence in radiology and its intersection with education and change management, investigating its incorporation into training programs, the obstacles encountered by radiology professionals, and the potential of AI to transform clinical practices through targeted educational strategies.

Artificial Intelligence (AI) refers to machines or systems that execute tasks usually necessitating human intelligence, such as learning, reasoning, and pattern recognition (Barreiro-Ares et al., 2023). AI is swiftly gaining prominence in healthcare owing to its capacity to improve diagnostic precision, optimize operations, and expedite decision-making. AI is vital in radiology since it automates mundane operations like image processing and lesion detection. It also assists radiologists in recognizing patterns and abnormalities that humans may overlook. Evidence from recent clinical studies demonstrates AI's growing utility in diagnosing a wide range of conditions, including brain tumors, breast cancer, and neurodegenerative diseases, with increasing data supporting its potential to reduce diagnostic errors (Barreiro-Ares et al., 2023; Hwang et al., 2024). The market for AI in medical imaging is projected to expand from USD 1.67 billion in 2025 to USD 14.46 billion by 2034, highlighting the growing significance of AI in radiology procedures (Gokhale, 2025).

Radiologists are healthcare experts specializing in the interpretation of medical images to help diagnose illnesses and make treatment decisions (Hwang et al., 2024). As medical imaging advances and diagnoses become more intricate, AI is evolving into a supplemental instrument for radiologists. Artificial intelligence facilitates rapid analysis of extensive data sets by radiologists, automating monotonous tasks and permitting concentration on intricate diagnostic issues necessitating human skill (Liu et al., 2023). Rather than replacing radiologists, AI serves to augment their clinical capabilities, acting as a secondary reviewer and decision-support mechanism to enhance diagnostic precision (Huisman et al., 2021). The World Economic Forum anticipates that AI will generate 11 million new employment opportunities in healthcare, particularly in radiology, necessitating that radiologists acquire new competencies to collaborate effectively with AI technology (Saadia Zahidi, 2025).

Artificial intelligence is swiftly being incorporated into clinical practice, with a rise in its adoption by radiologists and other healthcare practitioners. A 2024 survey indicated that 66% of physicians utilized AI in their clinical practices, an increase from 38% in 2023 (Fox et al., 2025). The increasing interconnectedness is transforming the operational dynamics of radiology departments, enhancing diagnostic precision and efficiency. The shift to AI-driven workflows presents some obstacles. Numerous radiologists articulate apprehensions regarding job displacement (Murugesan et al., 2023) and the transforming aspects of their professional identity (Shiang et al., 2022). Such sentiment underscores the need for a balanced perspective, one that positions AI as an augmentative partner rather than a disruptive threat. Radiologists and artificial intelligence systems need to synergize to solve these issues by implementing AI as an augmented supporting tool instead of a replacement for human knowledge (Beer & Mulder, 2020; Stead, 2023).

Effective incorporation of artificial intelligence into radiology practice depends on change management. Education is a key component of change management. The AMA's 2024 research revealed that 36% of doctors were more enthusiastic than worried about AI's influence in healthcare, highlighting the mounting excitement about artificial intelligence in the medical sector (Fox et al., 2025). Educational institutions should include AI training within curricula, not only focusing on tools and applications but also emphasizing broader implications, such as patient communication, professional roles, and ethical responsibility (Barreiro-Ares et al., 2023).

Theoretical Foundations for Human-AI Interaction in Radiology

As AI systems become increasingly integrated into radiology departments, the role and identity of radiologists are undergoing a significant transformation (Caparros Galan & Sendra Portero, 2021; Huisman et al., 2021). AI's growing capabilities in diagnostic imaging, workflow management, and clinical decision-making are reshaping how radiologists work, interact with technology, and perceive their professional roles. While these technological advancements offer enhanced diagnostic accuracy and improved operational efficiency, they also introduce complex challenges, including shifts in professional identity, ethical dilemmas, and legal and financial implications unique to medical imaging (Park et al., 2021; Pauwels & Del Rey, 2021).

To examine how artificial intelligence (AI) reshapes radiology education and professional roles, this study introduces the "GrandFusion Framework"- a theoretical synthesis grounded in five foundational perspectives: Dewey's Experiential Learning, Simon's Bounded Rationality, Lewin's Change Management, Davis's Technology Acceptance Model (TAM), and Rogers's Diffusion of Innovations. These theories represent a layered analytical approach-individual, organizational, and systemic-and provide a multidimensional lens for understanding the role of education in supporting the adoption and normalization of AI in clinical practice.

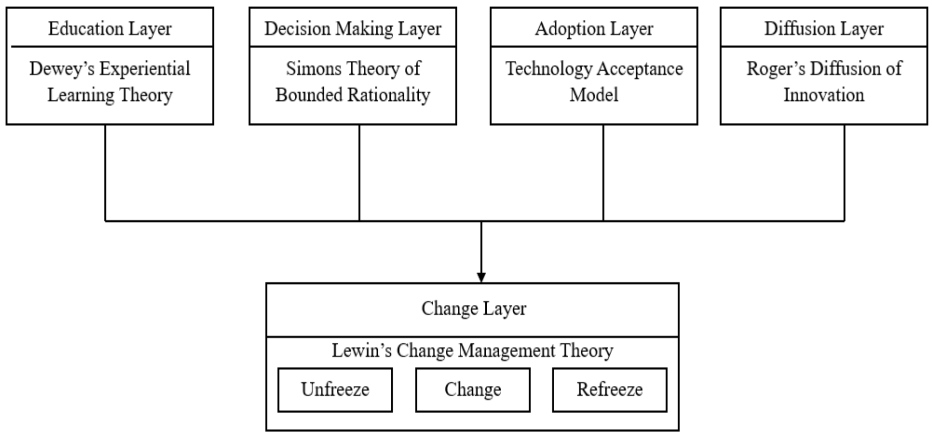

Figure 1. GrandFusion Framework

The GrandFusion Framework distinguishes itself by explicitly mapping each theoretical construct to Lewin's three-stage model of organizational change-Unfreeze, Change, and Refreeze, which offers a structured process for facilitating technological adoption and integration. This theoretical fusion translates into actionable pathways for guiding AI technology integration. The name "GrandFusion" pays tribute to the intellectual "grandfathers" of the theories: John Dewey, Herbert Simon, Kurt Lewin, Everett Rogers, and Fred Davis. These theories were selected because they collectively span multiple layers of the AI adoption process at the individual, social, organizational, and systemic levels, providing a comprehensive lens through which to examine the educational and change dynamics relevant to artificial intelligence and to education as change management within the radiology domain.

Dewey's Educational Philosophy (Dewey, 1938) Emphasizes experiential learning, reflective inquiry, and collaborative problem-solving. In radiology, this philosophy underlines the importance of interactive training, hands-on experimentation, and continuous education to equip radiologists with the skills to navigate an AI-enhanced diagnostic ecosystem.

Simon's Theory of Bounded Rationality (Simon, 1957) Reminds us that radiologists and decision-makers operate under cognitive and informational constraints. Faced with complex AI systems, they often adopt "satisficing" solutions, a pragmatic approach that is especially relevant in the clinical environment of radiology decision making.

Lewin's Change Management Theory (Lewin, 1947) Enables the creation of a structured roadmap for managing transformation within radiology departments. By framing change in three stages, unfreezing (preparing radiologists for new paradigms), change (implementing AI-driven practices), and refreezing (institutionalizing AI as a routine element), this theory supports the sustainable integration of AI.

Technology Acceptance Model (Davis, 1989) This allows us to focus on the individual radiologist's perspective, positing that acceptance of AI tools hinges on their perceived usefulness (PU) and perceived ease of use (PEOU), which determine a radiologist's intention to use a system, with this intention serving as a mediator of actual system usage. As radiologists incorporate AI into daily workflows from image interpretation to clinical reporting, their attitudes toward these systems are pivotal to successful integration**.**

Diffusion of Innovations (Rogers, 2003) It enables us to explain how AI technologies spread through radiology practices by emphasizing the role of early adopters and opinion leaders. In radiology, pioneering specialists and leading departments can showcase AI's relative advantages, such as improved diagnostic precision and workflow efficiency, to foster broader acceptance and shift professional identity.

Together, these theories offer a comprehensive view of how AI integration impacts radiologists and the change management processes, emphasizing education to facilitate successful decision making and change. By aligning each theory with a specific stage in Lewin's change process (see Figure 1), the framework operationalizes theory into actionable pathways that institutions can use to design, implement, and evaluate AI integration strategies in radiology.

To guide our systematic exploration of how artificial intelligence is reshaping radiology education and professional roles, we grounded our work in the GrandFusion Framework. Utilizing these perspectives, we developed two research questions that examine the intersection of adoption, change management, and education in the context of AI and radiology practice.

Research Questions:
RQ1: *What educational approaches are utilized to support AI integration into Radiology?*
RQ2: *How are the key change management stages supporting the integration of AI in radiology?*

Methodology

This study followed the PRISMA guidelines (Page et al., 2021) for a systematic review to investigate the role of Artificial Intelligence (AI) in radiology education, focusing on the radiologist's role. The literature search used the query: "Artificial Intelligence" or "AI" and "radiologist" or "radiology" and "role," covering studies published between January 1, 2019, and December 31, 2024.

The databases searched included ACM Digital Library, IEEE/IET Electronic Library, Elsevier ScienceDirect, ProQuest Central, and PubMed/Medicine. Only peer-reviewed, full-text, empirical studies in English were included, ensuring the inclusion of high-quality and relevant academic work. Non-article formats such as books, dissertations, surveys, and literature reviews were excluded. The studies had to specifically focus on AI's role in radiology education and the professional development of radiologists, excluding research in other medical fields.

The review process, detailed in the PRISMA flowchart (Figure 2), included three stages: removal of duplicates, title and abstract screening, and full-text review. Zotero was used to track article references and check for duplicates. Key data, such as author, year, methodology, AI algorithms, and educational focus, were extracted into a spreadsheet. To reduce bias, a second researcher independently reviewed 50% of titles and abstracts. This comparison yielded a 92% inter-rater agreement rate, supporting the reliability and consistency of the screening process.

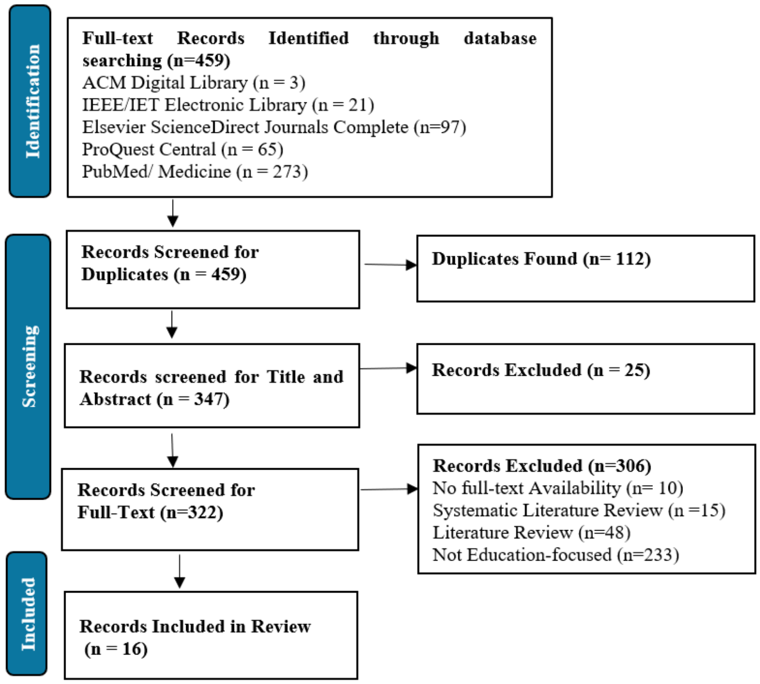

Figure 2. PRISMA Chart

The initial search yielded 459 results, which were narrowed down to 16 articles after screening for radiology education. The reasons for exclusion included a lack of focus on AI in radiology education or the radiologist's role. The final 16 articles were reviewed in detail. Abstracts were extracted and analyzed to generate a word cloud from the top 50 terms, as shown in Figure 3. Text preprocessing involved converting characters to lowercase, removing stop words, punctuation, and numbers, and applying stemming. The most frequent terms were "AI," "radiology," and "medical students."

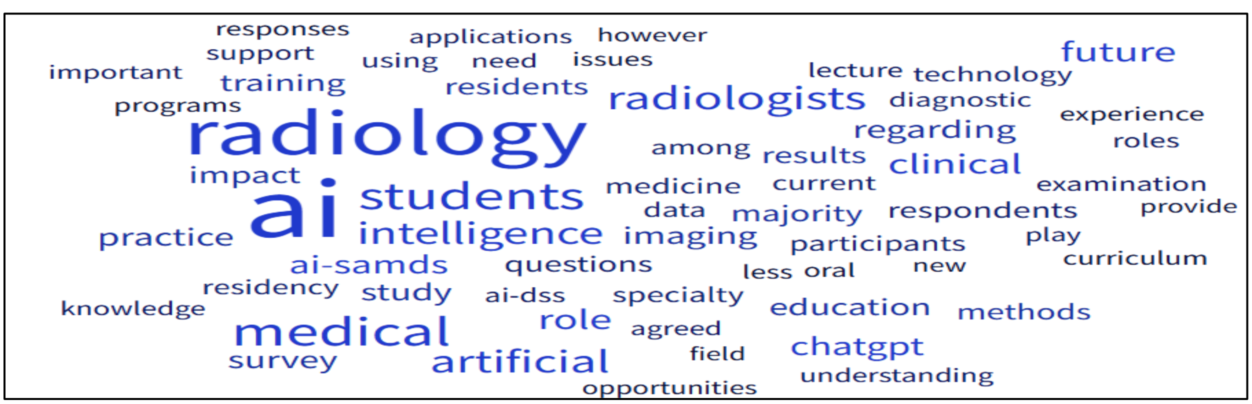

Figure 3. Top 50 Abstract Terms

The table below answers RQ1: What educational approaches are utilized to support AI integration into radiology? By outlining the articles used, including their year of publication, short title, and the type of education or professional development identified. These studies span from 2020 to 2024. The educational methodologies are identified and include formal education (undergraduate or residency training), continuing medical education (CME), and professional development (skills enhancement for practicing radiologists). This diversity in educational sources reflects the breadth of research on integrating AI into radiology education at different stages of a radiologist's career.

Table 1. Chronological overview of articles with titles and education Categories

Year	Article	Education Type
2024	Attracting Future Radiologists: ESR Statement (Zhong et al., 2022)	Formal
	2023 AI Software User Experience in Radiology (Hwang et al., 2024)	Professional Development
	Radiographer Education on AI: A Survey (Doherty et al., 2024)	Formal, Continuing, Professional Development
	Could ChatGPT Pass UK Radiology Exams? (Ariyaratne et al., 2024)	Formal
2023	AI's Impact on Attracting Medical Students to Radiology (Liu et al., 2023)	Formal, Continuing
	Students' Views on AI in Radiology (Barreiro-Ares et al., 2023)	Formal
	ChatGPT's Perception Among MSK Clinicians (Iyengar et al., 2023)	Continuing
	ChatGPT from Radiologists' Perspective (Sendur et al., 2023)	Professional Development
	AI and Radiology Jobs: A Message to Students (Murugesan et al., 2023)	Formal
2022	AI-Based Decision Support in Radiology Residency (Shiang et al., 2022)	Formal
2021	Saudi Radiology Community's View on AI (Alelyani et al., 2021)	Formal, Continuing, Professional Development
	AI in Radiology: A Global Survey of Radiologists (Huisman et al., 2021)	Continuing
	AI in Oral Radiology: Brazilian Dentists' Views (Pauwels & Del Rey, 2021)	Formal
	Medical students' views on AI's impact in radiology (Caparros Galan & Sendra Portero, 2021)	Formal
	Medical Students' Perspectives on AI in Medicine (Park et al., 2021)	Formal
2020	AI and the Radiology Trainee Experience (Simpson & Cook, 2020)	Formal

Our results, presented in the GrandFusion integrated framework and mapping table, answer RQ2: How are the key change management stages supporting the integration of AI in radiology? This table explains how AI is reshaping radiology by mapping key themes across theoretical and organizational change dimensions. We utilized the well-defined theoretical framework to draw deductive themes from the literature (Pearse, 2019).

The results underscore the importance of addressing not only the technical and operational aspects of AI adoption but also the evolving professional identities and workplace practices of radiologists. This approach is essential for understanding and navigating the opportunities and challenges that arise as AI continues to redefine the field of radiology.

Table 2. GrandFusion: Mapping Theory Components to Lewin's Change Stages in Radiology

Change Management Model (Lewin)	Diffusion of Innovations (Rogers)	Technology Acceptance Model (Davis)	Bounded Rationality (Simon)	Educational Philosophy (Dewey)	Articles
Unfreeze	Identify influential radiologists and early adopter departments. Communicate the relative advantage of AI in improving diagnostic accuracy and efficiency.	Raise awareness among radiologists about AI's potential benefits. Address initial concerns regarding user-friendliness and clinical integration.	Recognize that radiologists face cognitive limits when evaluating new technologies. Encourage pragmatic, "satisficing" assessments to initiate change.	Engage radiologists in reflective inquiry about current diagnostic challenges. Use case studies and hands-on demonstrations to illustrate the need for AI.	(Alelyani et al., 2021; Barreiro-Ares et al., 2023; Caparros Galan & Sendra Portero, 2021; Huisman et al., 2021; Iyengar et al., 2023; Murugesan et al., 2023; Park et al., 2021; Pauwels & Del Rey, 2021; Sendur et al., 2023)
Change	Leverage radiology networks to share success stories and pilot results. Implement targeted AI projects in diagnostic imaging to showcase benefits.	Enhance perceptions of AI's utility and ease of integration via practical training sessions, demos, and simulations in radiology settings.	Support incremental decision-making as radiologists adapt to AI systems Allow for adaptive, "satisficing" choices during the transition phase.	Facilitate interactive workshops and collaborative learning sessions for radiologists. Encourage continuous feedback and reflective practice during AI implementat ion.	(Ariyaratne et al., 2024; Doherty et al., 2024; Hwang et al., 2024; Liu et al., 2023; Ranjan et al., 2023; Shiang et al., 2022; Simpson & Cook, 2020)
Refreeze	Institutionalize AI in radiology through sustained support and recognition of successful integration. Celebrating transformed diagnostic practices and improved patient outcomes.	Embed AI systems into routine radiology workflows. Provide ongoing training, updates, and technical support to maintain high acceptance levels.	Standardize "satisficing" decision processes within radiology departments. Integrate streamlined evaluation practices into daily clinical routines.	Foster a culture of continuous learning and reflective practice among radiologists. Ensure that AI-enhanced practices become a permanent and valued part of radiology.	(Beer & Mulder, 2020; Fox et al., 2025; Gokhale, 2025; Stead, 2023; Zhong et al., 2022)

Thematic Evaluation
Representative articles formed the foundation for identifying the five key themes in the thematic evaluation. They highlight how AI is incorporated into medical and radiology education, its influence on career perceptions, and its challenges and opportunities.

1. Experiential Learning and Continuous Education: Aligned with Dewey's educational philosophy, int eractive learning opportunities such as simulation-based training and collaborative workshops are essential for preparing radiologists to work alongside AI technologies and fostering a culture of ongoing learning and reflective practice (Dewey, 1938; Doherty et al., 2024). Integrating AI into medical curricula is critical for developing AI-literate healthcare professionals. Global surveys highlight strong support for integration, with 56.1% of respondents and 82% in Saudi Arabia expressing the importance of AI in medical education. (Alelyani et al., 2021; Park et al., 2021). Additionally, 85% of medical schools have either started or plan to incorporate AI topics into their programs. (Doherty et al., 2024; Hwang et al., 2024; Sendur et al., 2023). Despite broad agreement, gaps remain, with only 51.6% of students considering themselves knowledgeable about AI and 71% answering AI-related questions correctly. (Caparros Galan & Sendra Portero, 2021). In one study, 72.9% of respondents advocated for AI training to be part of residency programs (Huisman et al., 2021). There is a strong consensus that early exposure to AI will better prepare students to integrate AI into their clinical practice, thus enhancing diagnostic accuracy and patient care. While AI enables personalized learning by adapting to individual strengths and weaknesses, hands-on experience remains crucial for real-world application (Shiang et al., 2022; Simpson & Cook, 2020).

2. Incremental Decision-Making Under Cognitive Constraints: Simon's theory of bounded rationality explains how radiologists manage AI integration through pragmatic, "satisficing" decisions that balance complexity and clinical utility (Simon, 1957). AI-driven tools are proving valuable in enhancing radiology education. Tools like Zebra Medical Vision, which achieved a sensitivity of 95.11% and specificity of 91.98% in intracerebral hemorrhage detection, and GPT-4 for exam preparation, demonstrate the tangible benefits of AI in refining diagnostic accuracy and assisting in exam preparation (Ariyaratne et al., 2024; Murugesan et al., 2023). In one study, 73% of radiology programs reported significant improvements in diagnostic accuracy due to AI tools (Doherty et al., 2024; Hwang et al., 2024; Iyengar et al., 2023). However, while these tools show promise, their adoption remains limited, with only 28.7% of clinicians actively using them (Iyengar et al., 2023). These findings suggest that while AI's benefits are acknowledged, broader adoption depends on addressing concerns about usability and trust in clinical contexts.

3. Social Influence and Diffusion Networks: Drawing on Rogers' Diffusion of Innovation, influential radiologists and early adopter departments play a pivotal role in modeling AI integration (Rogers, 2003). Their success stories, demonstrations, and peer mentorship foster broader acceptance among peers. Early adopters are generally more receptive to technical advancements and can sway others by showcasing AI's worth through case studies, success narratives, and initial exposure to the technology (Doherty et al., 2024). The early and late majority embrace AI after its efficacy has been established. Education facilitates this transition by alleviating fears, demonstrating AI's practical advantages, and diminishing mistrust. This group usually needs more convincing, hence educational initiatives should concentrate on showing how artificial intelligence enhances their current methods instead of endangering their professional positions. (Doherty et al., 2024; Shiang et al., 2022). Laggards are the last group to embrace advances. Education aimed at laggards has to concentrate on conquering anxiety and proving the long-term advantages of artificial intelligence. Convincing this group of value depends on open communication on how artificial intelligence may lower workloads without jeopardizing patient care (Alelyani et al., 2021). It is essential to select mentors from appropriate adoption categories. Mentorship is pivotal in guiding students through the integration of AI technologies in radiology. Experienced mentors help students understand how AI can complement rather than replace human expertise. Surveys indicate that 67% of residents value mentorship in AI, and 85.4% of radiology residents desire mentorship to understand AI's evolving role (Doherty et al., 2024; Huisman et al., 2021). Mentors aid in contextualizing the application of AI in clinical practice and assist students in critically evaluating its limitations. Despite the appreciation for mentorship, apprehensions over excessive dependence on AI and the decline of human judgment remain (Ariyaratne et al., 2024; Iyengar et al., 2023; Sendur et al., 2023). Effective diffusion requires balancing AI's promise with a sustained emphasis on professional identity and human expertise.

4. Adoption and Acceptance of AI Technologies: According to the Technology Acceptance Model (TAM), radiologists' willingness to adopt AI depends on its perceived usefulness (PU) and ease of use (PEOU) (Davis, 1989). The adoption of AI technologies, including AI-based Decision Support Systems (AI-DSS), is more probable when they are regarded as enhancing diagnostic precision and operational efficiency (Shiang et al., 2022). Radiologists and medical students learn how AI might augment clinical efficacy through education, making technology more appealing and pertinent to their practice. By offering hands-on training and showing the valuable application of artificial intelligence in clinical and educational settings, education may demonstrate to the PU and PEOU how AI enhances diagnostic methods and streamlines workflows. (Pauwels & Del Rey, 2021; Shiang et al., 2022). According to the TAM framework, training programs improve PEOU, enabling healthcare personnel to be confident in utilizing AI for their workflow. Empirical work shows that demonstrable benefits, such as improved diagnostic accuracy and efficiency, are essential to overcoming resistance and facilitating smoother adoption (Park et al., 2021; Simpson & Cook, 2020). Many students worry about AI replacing radiologists; however, knowledge of its uses in radiology remains lacking. In one study, 50% of students said they lacked sufficient exposure to AI training, and 40.5% of students felt confident in their knowledge of AI in clinical radiology (Barreiro-Ares et al., 2023). The discrepancy in AI literacy emphasizes the importance of organized education to raise students' knowledge of AI's role in enhancing diagnostic accuracy and workflow efficiency (Huisman et al., 2021). Following focused AI instruction, worries about AI replacing radiologists lessened; 94.4% of students supported including it in training (Pauwels & Del Rey, 2021).

5. Augmentation of Professional Identity: AI is reshaping radiologists' professional identity—from image interpreters to integrators of AI-driven decision support tools. While some view AI as a threat to expertise, many see it as an opportunity to expand clinical capabilities and redefine the profession (Caparrós Galán & Sendra Portero, 2021; Huisman et al., 2021). With many students seeing radiology as a dynamic, data-driven profession rather than a conventional specialty, artificial intelligence is changing how they approach this specialty. Approximately 64.7% of students reported increased interest in radiology due to AI and 60% believed AI would enhance radiology practice without replacing radiologists (Barreiro-Ares et al., 2023; Huisman et al., 2021). Despite lingering concerns about job security, 75% of students are more likely to pursue radiology because of AI's impact (Doherty et al., 2024). These trends suggest that AI can enhance radiology's appeal and elevate its clinical significance when properly contextualized through education.

6. Organizational Change and Workflow Integration: Using Lewin's three-stage Change Management Model—Unfreeze, Change, refreeze—AI adoption in radiology can be viewed as a structured organizational transformation. In the Unfreeze stage, professionals must first understand AI's value and overcome initial skepticism through targeted education and awareness (Alelyani et al., 2021). From the literature, this phase of artificial intelligence adoption emphasizes overcoming opposition and misunderstandings. Helping professionals and students to grasp the advantages of artificial intelligence, such as improved diagnosis accuracy and workflow efficiency, dependent on educational programs and seminars, is vital. Educational programs play a central role in bridging knowledge gaps, alleviating resistance, and fostering cultural readiness. Education enables people to go beyond their first mistrust by filling information gaps and relieving anxiety (Alelyani et al., 2021; Shiang et al., 2022). The Change stage is when AI tools find their way into the processes. AI-related roles will significantly grow by 2030, with an anticipated 11 million jobs created, indicating the rising importance of AI in reshaping healthcare roles (Saadia Zahidi, 2025). Refreeze is the final stage, which focuses on consolidating AI practices into routine operations. Continuous education, support, and feedback ensure that AI tools become integral to daily activities. As 82% of the reduction in human-performed tasks 2030 is attributed to automation (Saadia Zahidi, 2025). Education must help healthcare workers adapt and thrive in human-machine collaboration. Ongoing support, such as AI "superusers" and mentorship, ensures that AI-enhanced practices become sustainable elements of daily clinical routines (Doherty et al., 2024).

These insights demonstrate that AI integration in radiology is not solely a technical shift but a comprehensive transformation reshaping education, professional identity, decision-making, and educational processes. Each theme reinforces the pivotal role of education, not just as a means of skill development, but as a strategic enabling of change management.

Discussion

The results indicate that the future state of AI in Radiology should leverage change management and education to cultivate an atmosphere in which AI is not merely a tool to be mastered but rather a fundamental component of the profession that transforms diagnostic methodologies, workflows, and professional roles. Radiologists' views on artificial intelligence are primarily shaped by effective change management strategies, with education playing a pivotal role. Early exposure to AI tools and structured mentoring programs builds confidence, encouraging radiologists to view AI as a complement rather than a threat to their diagnostic capabilities. (Zhong et al., 2022). Thus, there is a clear need to bridge the gap between technological innovations and educational practices, particularly in how we study the integration of AI. By applying a theoretical lens, future research can better guide the development of training programs that not only teach AI tools but also foster an understanding of the evolving roles of radiologists in a future where AI plays a central role.

Limitations

This study is not without limitations. The search was limited to academic databases such as ACM Digital Library, IEEE/IET Electronic Library, Elsevier ScienceDirect, ProQuest Central, and PubM ed/Medicine, thereby limiting the findings. The coding of the literature results as systematic reviews is threatened by misclassification, which was minimized by having two authors code the studies with input from the third author to resolve any issues with the classification. The final limitation is utilizing academic subscription databases as our only source of literature. We limited the paper selection to search criteria, including artificial intelligence, radiology, and role.

Conclusion

As AI evolves, educational initiatives must extend beyond technical training to address the psychological and professional transformations associated with new technologies (Beer & Mulder, 2020; Stead, 2023). Ultimately, education will catalyze change, empowering radiologists to fully leverage AI's capabilities while preserving their expertise and professional identity in an increasingly augmented healthcare landscape. The GrandFusion Framework serves as an organizing structure for synthesizing findings across these themes. By grounding the review in established theories and mapping their application to real-world changes in radiology, the framework offers an initial model for research and practice in healthcare innovation. The role of change management is often understated in literature. Yet, it is critical for understanding how radiologists' roles are evolving and how these changes can be supported through training, mentorship, and curriculum reform. The discussion on potentially expanding AI's role in healthcare enhances its practical relevance. The wisdom of theoretical Grandfathers, Simon and Dewey, combined with IS theories, has informed our integrated framework to investigate the challenges and opportunities posed by AI and use the past to inform the future.

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