

MINI-REVIEW

Emotional intelligence and artificial intelligence as catalysts for professional development and lifelong learning among healthcare professionals: A literature review

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Abstract

The current healthcare professionals require interdisciplinary training that integrates emotional intelligence (EI) and artificial intelligence (AI). EI equips healthcare professionals with the ability to communicate empathetically, provide patient care, and regulate emotions, while AI serves as a knowledge-based decision support system that improves decision-making and clinical efficiency. This study explores the integration of EI and AI in healthcare and examines their combined impact on both instructional methods and clinical practice. In addition, we evaluated the role of EI in fostering patient interaction, strengthening teamwork, and combating burnout, alongside the role of AI in advancing learning, improving diagnostic accuracy, and enabling personalized care. Moreover, existing literature on EI and AI is discussed in this study to highlight their complementary roles in enhancing healthcare practices. A combined EI and AI training approach can offer a holistic training model for preparing healthcare professionals. While EI enhances its ability to handle emotional challenges, AI provides data-driven information that can sharpen clinical thinking and improve efficiency. Together, EI and AI play a crucial role in enhancing patient care, decision-making, and teamwork. An integrated approach that combines both AI and EI, aimed at enhancing clinical skills and professional development, represents a promising advancement in healthcare practice. Integrating EI with AI tools optimizes both human and technological capabilities, fostering a more competent, compassionate, and productive healthcare workforce.

Keywords: Artificial intelligence; Emotional intelligence; Healthcare; Patient-centered care; Professional development

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Citation: Hachoumi N, Eddabbah M. Emotional intelligence and artificial intelligence as catalysts for professional development and lifelong learning among healthcare professionals: A literature review. *Artif Intell Health*. 2025;2(3):154-160.
doi: 10.36922/AIH025080011

Received: February 18, 2025**Revised:** March 24, 2025**Accepted:** April 28, 2025**Published online:** May 15, 2025

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1. Introduction

Healthcare professionals require more than just technical skills to effectively manage their responsibilities in the healthcare sector. It is imperative for them to be adaptable to rapidly

changing circumstances, to make swift decisions under pressure, and to provide patient-centered, compassionate care.¹ Therefore, a varied skill set is essential. In general, a broad range of skills are really necessary, especially the combination of EI and AI as they are increasingly being recognized as key elements underpinning contemporary healthcare practice.²

Despite their differences, both EI and AI have made significant contributions to healthcare, impacting both clinical practice and professional development (PD) across healthcare systems. This study extends existing literature on EI and AI by exploring their complementary roles in PD and offering new insights into their combined potential to address persistent challenges in healthcare. AI provides revolutionary tools that enhance healthcare professionals' capabilities, broaden their knowledge, and improve their ability to meet patients' needs. Meanwhile, EI equips healthcare professionals with the ability to perceive, analyze, and control both their own emotions and those of others.³

In recent decades, EI has gained widespread recognition as a key driver of effective healthcare. The 1995 Goleman's theory highlights the importance of understanding and managing emotions in the workplace. In the healthcare sector, EI enables healthcare professionals to communicate more effectively, build stronger connections with patients, and foster collaborative environments with colleagues.⁴ The importance of these skills cannot be overstated, especially in emotionally charged situations where empathy and emotional connection can significantly influence a healthcare professional's performance. Healthcare professionals with higher EI are better equipped to meet patient needs, demonstrate empathy, and respond with patience – all of which are essential aspects of comprehensive, human-centered care.⁵ Moreover, EI plays a vital role in supporting healthcare professionals' well-being by helping to reduce stress, prevent burnout, and manage emotional challenges common in the profession.⁶ While EI has been widely discussed, this study explores the integration of EI and AI to further support and scale emotional competencies in healthcare training.

Furthermore, AI is transforming the ways in which healthcare professionals learn, practice, and access information. AI capabilities provide healthcare professionals with unique opportunities to engage with educational content relevant to their skills and needs, enabling the development of highly personalized learning experiences.⁷ This study highlights the potential of AI in creating adaptive learning pathways when combined with emotional attunement, presenting a promising advancement in health education.

AI – ranging from diagnostic robots that enhance clinical judgment to adaptive learning platforms that

tailor content to the user's abilities – enables healthcare professionals to engage in lifelong learning. Using these tools, they can keep their knowledge and skills up-to-date, stay informed about healthcare advances, and continuously develop practical skills. AI-based platforms revolutionize the speed and quality of skills development by providing interactive simulations, personalized examinations, and immediate feedback.⁸

The integration of EI and AI in healthcare has created new opportunities for PD, requiring a more integrated approach to training and lifelong learning.⁹ This convergence holds the potential to reshape conventional methods of healthcare education and PD. This study aims to address the gap in the existing literature by exploring the synergy between AI and EI in shaping the training of healthcare professionals who are both empathetic and technologically skilled. In such an approach, doctors and nurses are trained not only to make accurate diagnoses with the assistance of AI but also to communicate those diagnoses with empathy and EI.¹⁰ Together, EI and AI can help foster a healthcare workforce that is not only technically skilled but also highly sensitive to the human aspects of care.¹¹

This study explores the integration of EI and AI in the PD and lifelong learning of healthcare professionals. It focuses on the synergy of EI and AI in shaping more adaptable, resilient, and compassionate healthcare professionals capable of meeting the new demands of modern medicine. By exploring the promising potential of this integrated approach, this study provides a new perspective on how it may reshape healthcare training and ultimately enhance patient care.

2. Methodology

This study explores the roles of EI and AI in supporting the PD of healthcare professionals. Both the ability to engage emotionally with patients and proficiency in current technological advancements are essential in modern healthcare. This integrated approach equips healthcare professionals to better manage their responsibilities, improve patient care, and foster empathy in a rapidly changing healthcare environment. By balancing technical proficiency and patient-centered care, this approach has the potential to enhance both PD and clinical outcomes.

Therefore, this study investigates the combined impact of EI and AI in enhancing the skills of healthcare professionals and the quality of patient care. This methodological section outlines the research process, including the databases used, the keywords employed, and the inclusion and exclusion criteria applied in selecting relevant literature for analysis.

2.1. Databases

An extensive search was conducted using PubMed, Scopus, Connected Papers, EBSCO, and Google Scholar to identify relevant published studies.

2.2. Inclusion criteria

The selection criteria prioritized original and empirical research published in English between 2010 and 2024, focusing on studies that examined the impact of EI training or AI applications within the healthcare context.

2.3. Exclusion criteria

Studies were excluded if they were opinion-based, not peer-reviewed, or not focused on healthcare-related applications.

2.4. Search strategy

The search strategy incorporated keywords such as “emotional intelligence,” “artificial intelligence,” “healthcare professional,” “lifelong learning,” “clinical practice,” and “skill development.” Boolean operations (AND/OR) were applied to refine and narrow the search results.

2.5. Selection of articles

Articles were initially screened based on their titles and abstracts to determine their relevance. Full-text reviews were then conducted for articles that met the inclusion criteria to verify their suitability for the study.

2.6. Data extraction

Key information was extracted from the selected articles, including the authors’ names, publication dates, research methodologies, demographic details of the sample group, and main findings. A predefined template was used to ensure consistency in the data extraction process.

3. Results

The literature review offers valuable insights into the relationship between EI and AI in the context of healthcare professionals. A total of 15 studies met the inclusion criteria, indicating a strong consensus on the relevance of these constructs in PD. EI consistently emerged as a key factor in enhancing the effectiveness of healthcare professionals.⁵ Those with higher EI demonstrated greater abilities in recognizing and regulating both their own emotions and those of their patients.¹² This skill fosters stronger therapeutic relationships, enabling healthcare professionals to meet their patients’ needs with empathy, contributing to improved patient satisfaction and health outcomes.¹³

One study found that EI plays a crucial role in mitigating burnout among caregiver – a major challenge

in high-pressure healthcare settings.¹⁴ This aligns with other findings indicating that healthcare professionals with higher EI experience lower levels of stress and burnout, suggesting that EI may act as a protective factor against the emotional strain of a career in healthcare.¹⁴ In addition, EI has been linked to improved teamwork among healthcare professionals. By promoting effective communication and conflict management, EI contributes to a more cooperative work environment, and this sense of teamwork is especially valuable in multidisciplinary teams, where diverse expertise and perspectives are essential for delivering optimal patient care.¹²

3.1. The role of AI

AI is transforming the education and training of healthcare professionals. Adaptive learning systems are particularly promising for personalizing educational content based on individual learning styles and needs, alongside other AI technologies.¹⁰ For example, AI-powered platforms can analyze unique learning profiles and tailor content to better suit healthcare professionals.⁹ This personalized approach to learning enhances engagement and retention, which is crucial for ensuring healthcare professionals stay up-to-date with advancements in health sciences.¹⁵ Moreover, AI tools – such as chatbots and virtual assistants – facilitate patient interactions.¹⁶ These tools not only provide patients with immediate responses to their queries but also help healthcare professionals manage the emotional challenges associated with patient care.³ By supporting patients’ needs, AI systems allow healthcare professionals to provide the highest quality care without becoming overwhelmed by the emotional demands of their occupation.¹⁷

3.2. Synergistic effects of EI and AI

This review highlights the complementary benefits of integrating EI and AI in healthcare. For instance, AI tools can provide healthcare professionals with real-time feedback on patients’ emotional state by analyzing cues such as the tone of their voice and body language.¹⁸ Shaik *et al.*¹⁹ observed that AI tools help healthcare professionals to personalize their approach, enabling more responsive care to patients’ emotional needs. Incorporating EI training into the design of AI systems helps ensure that healthcare professionals use these technologies effectively and appropriately. Combining EI and AI training not only enhances healthcare professionals’ technical skills but also builds the emotional skills needed to successfully manage complex interactions with patients.²⁰ The integration of EI and AI presents a promising opportunity to advance healthcare practice, ensuring that technological innovation complements the human aspects of care.²⁰

Evidence from the existing literature shows that both EI and AI contribute to the PD of healthcare professionals. By fostering emotional competence alongside technical expertise, healthcare systems can improve the quality of patient care and support healthcare professionals' well-being. This dual focus is essential for addressing the evolving challenges within the healthcare sector.

This study identified several key studies that met the inclusion criteria, highlighting the significance of EI and AI in the PD of healthcare professionals. High EI was associated with improved communication, enhanced patient satisfaction, and reduced burnout. On the other hand, AI contributed to personalized learning tools, improved diagnostic accuracy, and supported decision-making. A summary of the studies is provided in [Table 1](#).

[Figure 1](#) presents a keyword cloud – generated using <https://github.com/eddabbah/keywordsMapGenerator/>

[blob/main/main.py](#) – that visualizes the key terms and concepts emerging from the reviewed studies. This visualization highlights the frequency and significance of the central themes, offering a concise overview of the critical ideas surrounding EI and AI in the context of healthcare professionals. It provides a clear illustration of the dominant themes and their relationships as identified in the research literature.

4. Discussion

4.1. Implications of EI and AI on the PD of healthcare professionals

The integration of EI and AI in the PD of healthcare professionals presents a valuable avenue for PD. Integrating EI into training programs helps healthcare professionals to enhance their communication skills and emotional regulation – both critical for effective interactions with

Table 1. Summary of key studies on the role of emotional intelligence and artificial intelligence in healthcare professionals

Authors	Title	Year	Sample size	Methodology	Research question	Key findings
Johnson ¹	The shifting landscape of health care: toward a model of health care empowerment	2011	150	Quantitative	The impact of EI on patient care	Improved communication and reduced burnout
Bohr and Memarzadeh ¹⁰	The rise of artificial intelligence in healthcare applications	2020	250	Systematic review	AI's role in personalized learning	Boosted engagement and personalized learning pathways
Karimi <i>et al.</i> ⁶	Emotional intelligence: predictor of employees' well-being, quality of patient care, and psychological empowerment	2021	300	Quantitative	EI and caregiver burnout	Reduced burnout and improved well-being
Cao <i>et al.</i> ¹⁴	The influence of emotional intelligence on job burnout of healthcare workers and mediating role of workplace violence: a cross-sectional study	2022	220	Cross-sectional	The effect of EI on job burnout and workplace violence	Lower burnout rates and better emotional regulation
McNulty and Politis ⁵	Empathy, emotional intelligence, and interprofessional skills in healthcare education	2023	120	Qualitative	EI in team dynamics	Enhanced teamwork and patient satisfaction
Coronado-Maldonado and Benítez-Márquez ¹²	Emotional intelligence, leadership, and work teams: a hybrid literature review	2023	100	Qualitative	EI and leadership in healthcare teams	Strengthened leadership skills and teamwork
Shaik <i>et al.</i> ¹⁹	Remote patient monitoring using artificial intelligence: current state, applications, and challenges	2023	180	Longitudinal	Synergy of EI and AI	Enhanced clinical decision-making and emotional regulation
Shukla ⁷	The impact of AI on improving the efficiency and accuracy of managerial decisions	2024	200	Mixed-methods	AI in diagnostics	Increased accuracy and decision efficiency
Narimisei <i>et al.</i> ¹¹	Exploring emotional intelligence in artificial intelligence systems: a comprehensive analysis of emotion recognition and response mechanisms	2024	130	Mixed-methods	AI-driven emotional recognition in clinical settings	Enhanced patient-clinician emotional communication

Abbreviations: AI: Artificial intelligence; EI: Emotional intelligence.

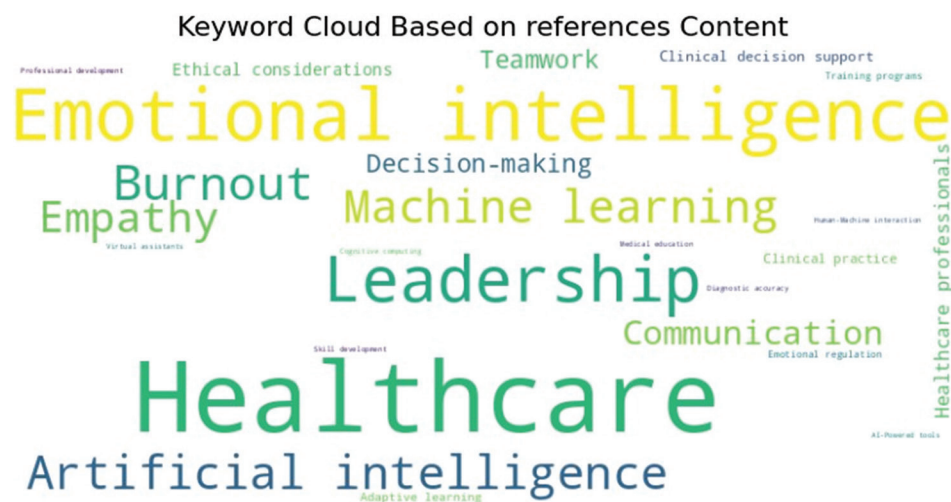


Figure 1. Keyword cloud generated from the content of the reviewed articles

patients. EI-focused modules in these programs have shown strong potential to improve healthcare professionals' ability to navigate the emotional complexities of patient care.²¹

Studies have shown that healthcare professionals with higher EI are more likely to engage in lifelong learning and effectively apply acquired knowledge in real-world settings.⁹ Therefore, integrating EI with AI-driven adaptive learning technologies not only supports the PD of healthcare professionals but also aligns with institutional goals of developing a more competent and compassionate workforce. This shift in educational priorities has the potential to improve the healthcare system's ability to deliver high-quality care.²²

4.2. The creation of collaborative learning environments

Collaborative learning plays a crucial role in healthcare education, as emotional skills are most effectively developed in group settings.²³ EI encourages open communication and conflict management, both of which are essential for delivering high-quality patient care.⁵ Integrating EI with AI improves these dynamics, creating richer and more adaptive learning experiences. AI platforms can facilitate group discussions and clinical case simulations, creating opportunities for collaborative learning. These environments foster mutual learning, allowing participants to share their unique skills and perspectives, thereby enhancing the overall team performance. Such collaboration is essential for building trust and shared accountability, both of which are vital to improving patient outcomes.²⁴

4.3. The impact of EI and AI on the motivation and commitment of healthcare professionals

EI has been associated with greater motivation for continuing education among healthcare professionals. Research shows that those with strong emotional regulation skills are more likely to participate in ongoing PD.²⁵ The use of AI in training enhances this process by providing immediate feedback, which increases engagement and sustains learning interest. AI systems can recognize when a learner reaches certain milestones and reward them for achieving them. This real-time responsiveness is particularly valuable in the fast-paced world of healthcare, where time is indeed money. By fostering a culture of lifelong learning and PD, healthcare organizations can motivate healthcare professionals to invest in their personal growth, leading to improved patient care and greater job satisfaction.²⁶

5. Limitations

The integration of EI and AI in healthcare training offers promising potential; however, several limitations must be addressed. One limitation is ensuring that training programs are comprehensive enough to educate healthcare professionals on the use of AI tools and to develop their EI skills. In addition, to implement AI systems effectively, institutions must provide financial resources for their establishment and activate the necessary infrastructure. However, financial accessibility may not be guaranteed in all institutions. Furthermore, over-reliance on AI could also weaken the human touch, which is essential in patient care. Ethical concerns, such as data privacy and

algorithmic biases, may further complicate the adoption of AI technologies. In addition, the subjectivity and context-sensitivity of EI make it challenging to measure the effectiveness of AI-based training. To address these limitations, further research and the development of protocols that facilitate the balanced integration of AI and EI across diverse healthcare settings are essential.

6. Future directions and research

Further investigation is needed to fully understand the clinical potential of integrating EI with AI, particularly in relation to patient outcomes and the well-being of healthcare professionals. Longitudinal studies could provide valuable insights into how this integration evolves over time and its impact on the performance of healthcare professionals and the quality of patient care.

The integration of EI and AI also holds valuable potential for guiding other aspects of healthcare, such as team organization and ethical decision-making. A deeper understanding of EI and AI in the context of leadership development and clinical ethics will be essential for the development of competent, well-rounded healthcare professionals.

Finally, it is essential to establish training programs for educators or trainers to ensure they are well-equipped to teach EI and effectively utilize AI tools. By preparing educators or trainers to educate these fundamental skills, healthcare institutions can foster a more competent and emotionally intelligent workforce capable of addressing the demands of modern healthcare.

7. Conclusion

Integrating EI with AI in healthcare education supports the PD of healthcare professionals and enhances patient care by fostering stronger emotional connections, which in turn improve empathy and patient satisfaction. At present, AI contributes to personalized learning by enabling data-driven decision-making, ultimately enhancing knowledge acquisition and clinical skills. The integration of EI and AI holds the potential to create a more technologically competent and emotionally intelligent workforce, thereby fostering stronger inter-professional collaborations and improving patient outcomes. Longitudinal studies are needed to thoroughly assess the overall impact of this innovation on PD and patient care. In turn, this new paradigm in healthcare education would shape healthcare professionals who are more emotionally and psychologically resilient.

Acknowledgments

None.

Funding

None.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

Conceptualization: All authors

Writing – original draft: Nadia Hachoumi

Writing – review & editing: All authors

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data

Not applicable.

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