Jurnal Pendidikan dan Pemikiran Islam
eISSN: 2809-0322
Vol. 6, No. 4, Juli-Agustus 2026
DOI: https://doi.org/10.69900/ag.v6i4.625

Transforming Educators' Competencies for Human Centered Learning in the Era of Artificial Intelligence: A Literature Review from the Perspective of Islamic Educational Values

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Abstract

This study aims to analyze the transformation of educators' competencies from the perspective of human-centered learning in the era of Artificial Intelligence. The study employed a descriptive qualitative approach using a library research method by analyzing national scientific articles published between 2020 and 2026 and indexed through Google Scholar. The data were analyzed using literature analysis techniques to identify thematic patterns, research tendencies, and conceptual syntheses related to teacher competencies in the AI era. The findings indicate that educators' competencies have shifted from conventional pedagogical competencies toward multidimensional competencies encompassing AI literacy, human-centered pedagogy, empathetic communication, reflective leadership, and technology-based collaborative learning. Human-centered learning has emerged as a dominant paradigm emphasizing empathy, social interaction, critical reflection, and meaningful learning experiences as the core of educational processes. The integration of AI has improved learning personalization, administrative efficiency, and instructional media innovation, yet it also poses the potential to weaken humanistic dimensions if not balanced with ethical and

social values. This study contributes theoretically to strengthening the discourse on AI-based human-centered learning and practically serves as a foundation for developing teacher training programs, AI literacy, and humanistic educational policies in Indonesia.
Keywords: Artificial Intelligence, Human Centered Learning, Educators' Competencies

Abstrak

Penelitian ini bertujuan menganalisis transformasi kompetensi tenaga pendidik dalam perspektif human-centered learning di era Artificial Intelligence. Penelitian menggunakan pendekatan kualitatif deskriptif dengan metode library research melalui analisis terhadap berbagai artikel ilmiah nasional yang dipublikasikan pada rentang 2020–2026 dan diperoleh melalui Google Scholar. Analisis dilakukan menggunakan teknik analisis literatur untuk mengidentifikasi pola, kecenderungan tema, dan sintesis konseptual terkait kompetensi guru di era AI. Hasil penelitian menunjukkan bahwa kompetensi tenaga pendidik mengalami pergeseran dari pedagogik konvensional menuju kompetensi multidimensional yang mencakup literasi AI, pedagogi human-centered, komunikasi empatik, kepemimpinan reflektif, dan pembelajaran kolaboratif berbasis teknologi. Human-centered learning berkembang sebagai paradigma utama yang menempatkan empati, interaksi sosial, refleksi kritis, dan pengalaman belajar bermakna sebagai inti proses pendidikan. Integrasi AI terbukti meningkatkan personalisasi pembelajaran, efisiensi administrasi, dan inovasi media pembelajaran, tetapi juga berpotensi melemahkan dimensi humanistik apabila tidak diimbangi penguatan nilai etis dan sosial. Penelitian ini berkontribusi secara teoretis dalam memperkuat diskursus human-centered learning berbasis AI serta secara praktis menjadi dasar pengembangan pelatihan guru, literasi AI, dan kebijakan pendidikan humanistik di Indonesia.
Kata kunci: Artificial Intelligence, Human-Centered Learning, Kompetensi Pendidik

A. Introduction

The development of Artificial Intelligence (AI) in education has shifted the global learning paradigm toward a more adaptive, personalized, and digitally-based system. A UNESCO report shows that AI integration in education has increased significantly since 2022, along with the development of generative AI and deep learning technologies that support learning automation, learning data analysis, and personalized teaching materials. This situation is driving a transformation in the competencies of educators, ensuring they not only master technology but also possess pedagogical, ethical, and humanistic skills in the learning process. Serdianus explained that education in the AI era faces significant challenges in the form of shifts in the relationship between humans and technology, potentially shifting the orientation of education to become too mechanistic.[1]This situation demonstrates that educational transformation cannot simply rely on technological advancements, but rather requires a human-centered learning approach that places humans at the heart of learning. This reality demonstrates that the competence of educators is a key factor in maintaining the balance between digital innovation and human values in modern education.

Global trends show that AI has been used in various educational activities, such as adaptive learning, automated assessment, virtual tutoring, and the development of interactive learning media. Handayani stated that the use of AI can increase the effectiveness of language learning through personalized materials and rapid analysis of

[1]Serdianus Serdianus, "Quo Vadis Education in the Era of Artificial Intelligence," preprint, Open Science Framework, September 6, 2023, https://doi.org/10.31219/osf.io/sf7hc.

student learning needs.[2]Sejati et al. also explain that AI opens up opportunities for innovation in science and mathematics learning through digital simulations and intelligent learning systems.[3]This condition was reinforced by Utami and Asmuni who emphasized that the transformation of digital education in the Society 5.0 era requires teachers to have technological skills as well as social sensitivity in accompanying students.[4]The global impact of AI developments is not only influencing learning methods but also transforming the competency structure of 21st-century teachers. These changes require educators to adapt to more flexible, reflective, collaborative, and humanistic learning models.

The concept of human-centered learning developed in response to the tendency of digital education to be overly focused on automation and technological efficiency. Human-centered learning emphasizes the importance of empathy, social interaction, critical reflection, and meaningful learning experiences in the educational process. Hakim explained that the human-centered learning approach can improve the quality of learning because it positions students as active subjects with emotional and social needs.[5]Jamil added that human-centered design-based educational management can create a more personal and contextual learning experience.[6]This thinking aligns with social constructivism theory, which places human interaction as the primary foundation of meaningful learning. The evolution of learning theory from teacher-centered to learner-centered and then human-centered demonstrates a shift in educational orientation from knowledge transfer to holistic human development.

The development of AI in education has sparked academic debate about the role of humans in digital learning systems. Some researchers believe AI can significantly improve learning efficiency, creativity, and productivity. Rochmad et al. explain that the use of AI can improve teacher work efficiency through the automation of administration and the creation of teaching materials.[7]Afifah et al. also stated that AI helps teachers create more innovative and engaging learning in elementary schools.[8]A different perspective was put forward by Sholihah and Aufa, who assessed that the

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[2] Tri Handayani, "The Role of Artificial Intelligence in Enhancing English Language Teaching," *Journal of Education and Applied Teaching (JEAT)* 2, no. 3 (March 2026): 1181.

[3]Wahyu Tresno Sejati et al., "The Role of AI in Innovation of Science Learning in Schools: Opportunities and Challenges,"*Journal of Research, Education and Teaching: JPPP* 6, no. 3 (November 2025): 212, https://doi.org/10.30596/jppp.v6i3.28320.

[4]Sri Utami and Asmunik, "DIGITAL TECHNOLOGY-BASED EDUCATIONAL INNOVATION IN IMPROVING THE QUALITY OF LEARNING IN THE ERA OF SOCIETY 5.0,"*Berajah Journal* 6, no. 2 (April 2026): 508, https://doi.org/10.47353/bj.v6i2.603.

[5] Abd Hakim, "Planning a PAI Learning System Based on Human-Centered Learning to Improve the Quality of Learning,"*SCHOLASTICA: Journal of Education and Culture* 7, no. 2 (November 2025): 52.

[6]Sabarun Jamil, "HUMAN-CENTERED DESIGN-BASED EDUCATION MANAGEMENT TO CREATE PERSONAL AND MEANINGFUL LEARNING EXPERIENCES,"*Proceedings of International Conference on Educational Management*3, no. 2 (December 2025): 145.

[7] Chandra Satria Rochmad, Irfan Nasar, and Mochamad Mujiono, "The Impact of Artificial Intelligence Utilization on Work Efficiency and Productivity of Secondary School Teachers," *JINEA: Journal of Innovation in Education and Learning* 1, no. 3 (October 2025): 163, https://doi.org/10.66031/jinea.v1i3.37.

[8]Aulya Afifah et al., "Utilization of Artificial Intelligence to Improve the Quality of Learning in Elementary Madrasahs: A Literature Review,"*Bitnet: Journal of Information Technology Education* 10, no. 3 (October 2025): 93, https://doi.org/10.33084/bitnet.v10i3.10974.

dominance of AI has the potential to cause dehumanization of education if human interaction is replaced by digital machines.[9]Salam and Ismail also emphasized that character education faces a serious threat when technology develops without strengthening ethical and spiritual values.[10]The debate shows that the integration of AI in education still requires a critical approach so that technological development remains in line with human values.

The Indonesian context demonstrates that AI-based educational transformation is developing rapidly alongside the implementation of Society 5.0 and the digitalization of national learning. Ramadhani explained that Indonesian education faces significant challenges in adapting curricula, teacher competencies, and learning systems to advances in digital technology.[11]Asih et al. stated that the teacher profile in the Society 5.0 era must reflect adaptive, creative, communicative, and technology-based abilities.[12]This condition is reinforced by Pela et al., who found that teacher competency in Indonesia still faces various problems such as low digital literacy, limited use of AI, and weak pedagogical readiness.[13]This reality demonstrates that transforming the competencies of educators is an urgent need to maintain the relevance of national education amidst global technological disruption. This challenge is increasingly complex because educators are required not only to master technology but also to uphold humanistic values in learning.

Various previous studies have discussed teacher competency, AI in education, and the transformation of digital learning. Budiman and Lyau examined the teacher literacy needed in the AI era through a systematic literature review and found the importance of digital competency and AI literacy for future teachers.[14]Zalisman also revealed that AI knowledge influences the teaching competency of Islamic education teachers in the context of digital literacy.[15]Another study by Sufyan and Kurniawan highlights the UNESCO AI Competency Framework for Teachers as a reference for

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[9]Nihayatus Sholihah and Ari Abi Aufa, "Humanization of Technology in Education: A Philosophical Analysis of the Threat of Dehumanization in the Era of AI-Based Digital Learning," *Wisdom : Journal of Islamic Religious Education Studies*2, no. 4 (December 2025): 107, https://doi.org/10.61132/hikmah.v2i4.1453.

[10]Nurfadillah Salam and Ismail Ismail, "Reflection on Educational Philosophy in Facing the Challenges of Character Education in the Era of Artificial Intelligence," *YOUPEIS : Journal of Education and Social Sciences* 4, no. 4 (November 2025): 60, https://doi.org/10.57218/jupeis.Vol4.Iss4.2159.

[11]Muhammad Ihsan Ramadhani, "TRANSFORMATION OF BASIC EDUCATION IN THE ERA OF SOCIETY 5.0 : ANALYSIS OF RELEVANCE, CURRICULUM ADAPTATION, AND IMPLEMENTATION CHALLENGES," *Cangkal : Journal of Social Sciences and Humanities* 1, no. 2 (November 2025): 8.

[12]Ni Putu Restu Trinadi Asih, Maria Fitriani Asni, and I. Wayan Widana, "TEACHER PROFILE IN THE ERA OF SOCIETY 5.0," *Widyadari* 23, no. 1 (April 2022): 85–93.

[13]Pela Pratama Putri Pela et al., "Analysis of teacher competency problems in Indonesia in the era of society 5.0," *Al-Amin Elementary Madrasah Teacher Education Journal* 4, no. 2 (October 2025): 507, https://doi.org/10.54723/ejpgmi.v4i2.337.

[14] Muhammad Arief Budiman and Nyan Myau Lyau, "TEACHER LITERACY NEEDED IN AN AI ERA FOR FUTURE ELEMENTARY SCHOOL TEACHERS IN INDONESIA: A SYSTEMATIC LITERATURE REVIEW," *Journal of Educational Insights* 5, no. 2 (August 2025): 982, https://doi.org/10.26877/jwp.v5i2.23395.

[15] Zalisman Zalisman, "The Artificial Intelligence Knowledge on Digital Literacy of Teaching Competence Among Islamic Education Teachers," *POTENSIA: Journal of Islamic Education* 11, no. 1 (July 2025): 23, https://doi.org/10.24014/potensia.v11i1.36936.

developing teachers' AI competencies.[16]These studies tend to focus on the technical and digital competencies of educators. The perspective of human-centered learning as the basis for teacher competency transformation has yet to be discussed in depth in Indonesian education literature. This situation highlights the need for research that integrates AI competencies with a humanistic approach to education.

Studies on teacher professionalism and identity in the AI era have also begun to develop in recent years. Albab and Ta'rifin explain that the transformation of teacher professionalism in the AI era encompasses shifts in pedagogical paradigms, ethics, and the identity of 21st-century teachers.[17]Ramadhan and Herdiyana found a shift in teachers' professional identity due to the increasing use of generative AI in learning.[18]Marzoan et al. added that AI-based reflective practice can help teachers improve the quality of learning more adaptively.[19]This perspective demonstrates that the transformation of educator competencies is no longer solely focused on technical skills, but also encompasses reflective, ethical, communicative, and empathetic abilities. This shift demonstrates that future education requires teachers who can integrate technology with human values in a balanced manner.

The research gap in this study lies in the limited literature that specifically addresses the transformation of educator competencies from a human-centered learning perspective in the era of Artificial Intelligence. Most previous studies have focused more on AI literacy, the use of digital technology, and learning media innovation without connecting them to the human-centered learning paradigm. Rofiq et al. have indeed discussed the transformation of deep learning-based learning from a digital humanism perspective, but their focus is more on learning transformation than on educator competencies.[20]Fernandes et al. also discussed ethical and human-centered principles in developing AI-based teaching modules, but their research focused more on teacher training activities.[21]This gap indicates the lack of a comprehensive literature synthesis on the relationship between AI, human-centered learning, and the transformation of educator competencies. This situation is the crucial basis for this research.

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[16] Yaziz Abi Sufyan and Deni Kurniawan, "Interpretation of UNESCO AI CFT Framework on Teachers' AI Competence Development," *Curricula: Journal of Curriculum Development* 5, no. 2 (June 2026): 491, https://doi.org/10.17509/curricula.v5i2.499.

[17]Ulul Albab and Ahmad Ta'rifin, "Transformation of Teacher Professionalism in the Era of Artificial Intelligence: A Review of the Paradigms, Ethics, and Identity of 21st-Century Teachers,"*Pawiyatan: Journal of Teacher Professional Education*, December 30, 2025, 136.

[18]Gildan Jaya Muhammad Ramadhan and Viyandi Herdiyana, "The Role of Teachers in the Generative AI Era: A Phenomenological Study of Professional Identity Shifts,"*Journal of Educational Sciences* 1, no. 3 (March 2025): 167–73, https://doi.org/10.65094/fyk3jn46.

[19] Marzoan et al., "Artificial Intelligence-Based Teacher Reflective Practice Mentoring in Teacher Working Groups,"*Kreasi: Journal of Innovation and Community Service* 6, no. 1 (April 2026): 154–69, https://doi.org/10.58218/kreasi.v6i1.2344.

[20]Ahmad Rofiq, Ingtia Juli Wantari, and Linda Nur Ainah, "A Transformation of Islamic Religious Education Learning Based on Deep Learning: Literature Analysis from a Digital Humanism Perspective,"*Indonesian Journal of Innovation Multidisipliner Research* 4, no. 2 (April 2026): 117, https://doi.org/10.69693/ijim.v4i2.466.

[21]Reno Fernandes et al., "Optimizing Artificial Intelligence (AI) Based on Ethical and Human-Centered Principles in Developing Teaching Modules for Teachers in Tanah Datar Regency,"*Abdi: Journal of Community Service and Empowerment*7, no. 4 (December 2025): 1390, https://doi.org/10.24036/abdi.v7i4.1718.

The urgency of research is growing as AI developments in education are progressing far faster than the competency of educators in the field. Nurhuda and Hafiz explained that the digital learning transformation in Indonesia still faces a gap in teacher competency in utilizing educational technology.[22]Khair also emphasized that teachers face significant challenges in maintaining the relevance of learning amidst the accelerated development of AI and Society 5.0.[23]Hilmi and Hilmi added that Indonesian education requires strengthening values-based digital literacy to prevent the loss of ethics, empathy, and social intelligence in learning.[24]These issues demonstrate that educator competency development must be directed toward the simultaneous integration of technology and humanistic values. A human-centered learning approach is a strategic alternative for maintaining a balance between technological innovation and character development in education.

This study aims to analyze the transformation of educator competencies from a human-centered learning perspective in the era of Artificial Intelligence through a qualitative literature review. This study is expected to provide a theoretical contribution by strengthening the concept of educator competencies that are adaptive to AI developments while remaining oriented towards human values. This research also contributes to expanding the study of human-centered learning-based education, which is still relatively limited in the national literature. The practical benefits of this research are expected to serve as a reference for teachers, educational institutions, and policymakers in designing educator competency development in the digital era. This study can also serve as a conceptual basis for developing learning models that balance technological intelligence and humanistic intelligence. The research results are expected to strengthen the direction of the transformation of Indonesian education towards an innovative, adaptive, and human-centered learning system.

B. Literature Review

The rapid advancement of Artificial Intelligence (AI) has significantly transformed various sectors of society, including education. Educational institutions are increasingly integrating AI-based technologies into teaching, learning, assessment, and administrative processes. These developments have created opportunities for personalized learning experiences and enhanced educational efficiency. However, the growing reliance on AI has also raised concerns regarding the preservation of human values within educational environments. Consequently, the concept of Human-Centered Learning (HCL) has emerged as an important framework for balancing technological innovation with human development. Within this context, educators are required to develop new competencies that enable them to integrate technology while maintaining meaningful human interactions.

Human-Centered Learning emphasizes the holistic development of learners by recognizing their cognitive, emotional, social, moral, and spiritual dimensions. Unlike

[22]Hengki Nurhuda and Muhammad Hafiz, "Conceptual Analysis of Technology-Based Learning Transformation in Indonesia Towards the Era of Society 5.0,"*LEARNTECH: Journal of Educational Technology* 2, no. 01 (March 2026): 27.

[23]Hubbil Khair, "LEARNING TRANSFORMATION IN THE ERA OF SOCIETY 5.0: TEACHER CHALLENGES AND STRATEGIES,"*JOURNAL OF EDUCATION AND TEACHER TRAINING* 4, no. 2 (April 2026): 94, https://doi.org/10.5281/zenodo.19605893.

[24]Raden Muhamad Hilmi and Fuad Hilmi, "VALUES-BASED DIGITAL LITERACY: CONSIDERING ETHICS, EMPATHY, AND ARTIFICIAL INTELLIGENCE IN INDONESIAN EDUCATION,"*Qolamuna: Islam, Education, Literacy and Humanities* 2, no. 2 (January 2026): 283

technology-centered approaches, HCL prioritizes human dignity, empathy, critical thinking, collaboration, and ethical decision-making. The emergence of AI technologies challenges educators to redefine their roles beyond information transmission. Since AI systems can efficiently provide information and automate routine tasks, teachers must focus on nurturing human qualities that machines cannot replicate.

This shift requires educators to become facilitators, mentors, moral guides, and learning designers. Therefore, competency transformation becomes a critical issue in contemporary educational discourse. From an Islamic perspective, education has always been fundamentally human-centered. Islamic educational philosophy emphasizes the balanced development of intellectual, spiritual, moral, emotional, and physical capacities. The concepts of *education*, *education*, and *correction* collectively reflect a comprehensive educational process that aims to produce righteous and knowledgeable individuals. These principles align closely with contemporary discussions on Human-Centered Learning. Therefore, examining educator competencies through the lens of Islamic educational values offers valuable insights for responding to the challenges posed by AI-driven educational transformation. Such an approach ensures that technological advancement remains aligned with ethical and spiritual objectives.

1. Human-Centered Learning in Contemporary Education

Human-Centered Learning has gained increasing attention as educational systems seek to respond to the complexities of the twenty-first century. This approach recognizes learners as active participants rather than passive recipients of knowledge. It encourages meaningful engagement, learner autonomy, creativity, and reflective thinking.[25] Human-Centered Learning also promotes personalized educational experiences that consider students' diverse backgrounds, interests, and capabilities. As educational technologies become more sophisticated, the need to preserve authentic human interaction becomes even more important. Consequently, HCL serves as a framework for maintaining educational relevance in a technology-rich environment.

The integration of AI into education presents both opportunities and challenges for Human-Centered Learning. AI-powered platforms can provide adaptive learning pathways, automated feedback, and personalized recommendations based on individual learner needs. These capabilities can enhance student engagement and learning outcomes when implemented appropriately.[26] Nevertheless, excessive dependence on technology may reduce opportunities for interpersonal communication and emotional development. Scholars have argued that education should not be reduced to data processing and algorithmic optimization. Instead, technological innovation must support rather than replace the human dimensions of learning.

Research on Human-Centered Learning consistently highlights the importance of educator competence in facilitating meaningful learning experiences. Teachers play a crucial role in creating supportive learning environments that foster curiosity, empathy, and collaboration. Even in highly digitized educational settings, students

[25] M Mozaffar, "Mechanistic Artificial Intelligence (Mechanistic-AI) for Modeling, Design, and Control of Advanced Manufacturing Processes: Current State and Perspectives," *Journal of Materials Processing Technology* 302 (2022), https://doi.org/10.1016/j.jmatprotec.2021.117485.

[26] J Su, "Artificial Intelligence (AI) in Early Childhood Education: Curriculum Design and Future Directions," *Computers and Education Artificial Intelligence* 3 (2022), https://doi.org/10.1016/j.caeai.2022.100072.

continue to require emotional support and ethical guidance from educators. AI technologies may assist instructional processes, but they cannot fully replicate human wisdom, compassion, and moral judgment. Therefore, educators remain central figures in achieving the goals of Human-Centered Learning. Their competencies must evolve to address emerging educational realities while preserving core human values.

2. Educator Competencies in the Era of Artificial Intelligence

The emergence of AI has transformed traditional conceptions of teacher competence. Historically, educators were primarily responsible for delivering content and assessing student performance. However, access to digital information and intelligent learning systems has reduced the exclusivity of teachers as knowledge providers. As a result, contemporary educators must develop competencies related to digital literacy, technological integration, and data-informed instruction.[27] They are expected to understand how AI systems function and how these technologies can support educational objectives. This transformation reflects broader changes in the nature of teaching and learning.

Digital competence has become one of the most frequently discussed educator competencies in the AI era. Teachers must possess the ability to evaluate, select, and utilize digital tools effectively within educational settings. They should also understand the ethical implications of AI technologies, including issues related to privacy, algorithmic bias, and data security. Developing digital competence enables educators to make informed decisions regarding technological adoption. Furthermore, it empowers them to guide students in becoming responsible digital citizens. Consequently, digital literacy extends beyond technical skills and encompasses critical and ethical dimensions.

Another important competency is pedagogical adaptability. AI technologies continuously evolve, requiring educators to remain flexible and responsive to emerging educational innovations. Adaptive educators are capable of redesigning learning activities, assessment strategies, and instructional approaches according to changing circumstances. They understand that effective learning depends on contextual factors rather than rigid instructional models. This adaptability allows teachers to leverage technological opportunities while addressing potential limitations. Therefore, continuous professional development becomes essential for sustaining educational quality in AI-enhanced environments.

3. Islamic Educational Values and Human-Centered Learning

Islamic educational philosophy provides a rich foundation for understanding Human-Centered Learning. Central to Islamic education is the concept of human beings as *caliph* (vicegerents) and servants of God. Education is therefore viewed as a process of nurturing individuals who can fulfill their responsibilities toward God, society, and the environment. This perspective emphasizes moral integrity, spiritual consciousness, and intellectual excellence. Unlike purely utilitarian educational approaches, Islamic education seeks holistic human development.[28] Such objectives closely resonate with the principles of Human-Centered Learning.

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[27] P Esmaeilzadeh, "Challenges and Strategies for Wide-Scale Artificial Intelligence (AI) Deployment in Healthcare Practices: A Perspective for Healthcare Organizations," *Artificial Intelligence in Medicine* 151 (2024), https://doi.org/10.1016/j.artmed.2024.102861.

[28] R Yilmaz, "The Effect of Generative Artificial Intelligence (AI)-Based Tool Use on Students' Computational Thinking Skills, Programming Self-Efficacy and Motivation," *Computers and Education Artificial Intelligence* 4 (2023), https://doi.org/10.1016/j.caeai.2023.100147.

The concept of *education* highlights the gradual development of human potential through guidance, care, and nurturing. Within Islamic educational thought, educators are responsible not only for transmitting knowledge but also for cultivating character and virtue.[29] This role requires compassion, wisdom, patience, and ethical leadership. These qualities remain highly relevant in the age of AI, where technological efficiency must be balanced with human sensitivity. Human-Centered Learning similarly emphasizes the importance of relationships and personal growth. Therefore, *education* offers valuable insights for contemporary educational transformation.

Another significant concept is *correction*, which focuses on the cultivation of proper conduct and moral discipline. Scholars such as Syed Muhammad Naquib al-Attas have argued that education should prioritize the formation of ethical and civilized individuals. In AI-mediated educational environments, moral considerations become increasingly important due to concerns about misinformation, technological misuse, and ethical decision-making. Educators must therefore possess competencies that enable them to guide students in navigating these challenges responsibly. Human-Centered Learning benefits from incorporating ethical frameworks that support character formation. Islamic educational values provide a comprehensive foundation for achieving this objective.

4. Transformation of Educator Roles from an Islamic Perspective

The integration of AI into education requires educators to move beyond conventional instructional roles. Rather than functioning solely as content experts, teachers increasingly serve as mentors, facilitators, coaches, and ethical guides. This transformation aligns with Islamic educational traditions that emphasize the teacher's role as a moral exemplar. Throughout Islamic history, scholars were respected not only for their knowledge but also for their character and integrity. Their influence extended beyond classrooms into broader social and spiritual development. Consequently, the educator's role remains fundamentally relational and value-oriented.

AI technologies can efficiently support information delivery, assessment, and administrative tasks. However, they cannot replace the human capacity for empathy, compassion, and ethical reasoning. Islamic educational values emphasize these uniquely human qualities as essential components of effective teaching. Educators are expected to demonstrate sincerity (*sincere*), justice (*adl*), and wisdom (*wisdom*) in their professional practice. These values contribute to the creation of supportive and meaningful learning environments.[30] Therefore, competency transformation should focus not only on technological skills but also on moral and spiritual development.

The concept of educator professionalism in Islam encompasses both competence and character. Technical expertise alone is insufficient for fulfilling the broader objectives of education. Teachers must also embody values that inspire trust, respect, and moral growth among learners. In Human-Centered Learning, similar emphasis is placed on authentic relationships and learner well-being. This convergence highlights the relevance of Islamic educational values for contemporary discussions on educational transformation. By integrating technological competence with ethical commitment, educators can effectively navigate the complexities of the AI era.

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[29] L J Labrague, "Student Nurses' Attitudes, Perceived Utilization, and Intention to Adopt Artificial Intelligence (AI) Technology in Nursing Practice: A Cross-Sectional Study," *Nurse Education in Practice* 73 (2023), https://doi.org/10.1016/j.nepr.2023.103815.

[30] I H Y Yim, "Artificial Intelligence (AI) Learning Tools in K-12 Education: A Scoping Review," *Journal of Computers in Education* 12, no. 1 (2025): 95, https://doi.org/10.1007/s40692-023-00304-9.

5. Ethical Challenges and Future Directions

The growing use of AI in education raises several ethical concerns that require careful consideration. Issues such as data privacy, algorithmic bias, surveillance, and unequal access to technology have attracted increasing scholarly attention. Educators must be prepared to address these challenges through informed and responsible decision-making. Human-Centered Learning advocates for the protection of learner autonomy, dignity, and well-being in technologically mediated environments. Islamic ethical principles similarly emphasize justice, accountability, and the protection of human rights.[31] These shared values provide a strong foundation for ethical educational practice.

Educational institutions play a critical role in supporting the transformation of educator competencies. Professional development programs should integrate technological, pedagogical, ethical, and spiritual dimensions of teacher education. Such programs can help educators develop balanced approaches to AI integration while preserving human-centered educational objectives. Institutional policies should also encourage reflective practice and ethical technology use. Furthermore, collaboration among educators, policymakers, technologists, and religious scholars can contribute to more holistic educational innovation. This interdisciplinary approach is essential for addressing complex educational challenges.

Future research should continue exploring the relationship between AI, Human-Centered Learning, and Islamic educational values. Empirical studies are needed to examine how educators implement these principles in diverse educational contexts. Researchers should also investigate the effectiveness of competency development frameworks that integrate technological and ethical dimensions. Understanding these dynamics can inform the design of more inclusive and value-oriented educational systems. As AI continues to evolve, the importance of human-centered and ethically grounded education will likely increase. Therefore, ongoing scholarly engagement remains essential for ensuring that technological progress contributes positively to human development.

C. Method

This study uses a descriptive qualitative approach with a library research approach. It aims to analyze the transformation of educator competencies in human-centered learning in the era of Artificial Intelligence in the context of Indonesian education. The descriptive qualitative approach was chosen because this study seeks to understand educational phenomena in depth through systematic interpretation of various relevant scientific literature sources.[32]The research data were obtained from national scientific articles accessed through the Google Scholar database with a publication period of 2020–2026. Source selection was carried out using a purposive sampling technique based on the relevance of the theme, journal credibility, recency of the issue, and the relationship of the study to the competence of educators, human-centered learning, and Artificial Intelligence in education. This study used

[31] A Narayanan, "AI Snake Oil: What Artificial Intelligence Can Do, What It Can't, and How to Tell the Difference," *AI Snake Oil What Artificial Intelligence Can Do What It Cant and How to Tell the Difference*, 2025, 209, https://www.scopus.com/inward/record.uri?partnerID=HzOxMe3b%5C&scp=105032978050%5C&origin=inward.

[32] Sugiyono, *Qualitative Research Methods*(Bandung: Alfabeta, 2022); L. J. Moleong, *Qualitative Research Methodology*, ed. Revised edition (Bandung: PT Remaja Rosdakarya, 2021).

approximately 30 scientific articles as the main sources of analysis. Data collection techniques were carried out through documentation and systematic literature searches using a research instrument in the form of a literature analysis sheet containing the identity of the article, the focus of the study, research methods, the concept of human-centered learning, forms of transformation of educator competence, implementation of Artificial Intelligence, main findings, and research gaps for each article analyzed. This instrument was used to facilitate the process of classification, reduction, and synthesis of data to produce a more comprehensive conceptual mapping related to the transformation of educator competence in the AI-based digital era. Data analysis was carried out thematically through the stages of data reduction, data presentation, interpretation, and drawing conclusions to find patterns of relationships between concepts that emerged in the literature.[33]Data validity is carried out through source triangulation and consistency checking between articles to maintain objectivity, depth of interpretation, and academic validity of research results.

D. Result and Discussion

Characteristics of Literature Findings

The results of an analysis of various literature indicate that the transformation of educator competencies in the Artificial Intelligence era has experienced a significant shift from conventional pedagogical competencies to multidimensional competencies based on human-centered learning. An analysis of articles published between 2020 and 2026 shows that the majority of research focuses on strengthening digital literacy, integrating AI into learning, teacher professionalism, and developing technology-based adaptive learning. Asih et al. explain that the teacher profile in the Society 5.0 era no longer only emphasizes the ability to transfer knowledge, but also the ability to adapt to technology, creativity, and social intelligence.[34]Similar findings were put forward by Budiman and Lyau, who emphasized that future teacher competencies require integration between AI literacy, pedagogical literacy, and digital ethics.[35]This situation demonstrates that the development of AI has driven a more complex and dynamic shift in the competency structure of educators. This transformation is reinforced by the emergence of various AI-based learning models that position teachers as facilitators of humanistic and collaborative learning. This shift demonstrates that teacher competency in the AI era is not solely technological, but also leads to strengthening the empathetic, reflective, and ethical dimensions of learning.

Analysis of the distribution of research themes shows that most articles discuss the integration of AI in teaching and teacher professional development, rather than specifically human-centered learning. Afifah et al. explain that the use of AI can improve learning quality through personalized materials and automated student learning assessments.[36]Sejati et al. also found that AI provides significant opportunities for innovation in science and mathematics learning through the use of interactive media

[33] A. M. Yusuf, *Quantitative, Qualitative, and Combined Research Methods*(Kencana, 2021); Mestika Zed,*Library Research Method*(Jakarta: Obor Indonesia Foundation, 2020), https://books.google.com.

[34] Asih, Asni, and Widana, "TEACHER PROFILE IN THE ERA OF SOCIETY 5.0."

[35] Budiman and Lyau, "TEACHER LITERACY NEEDED IN AN AI ERA FOR FUTURE ELEMENTARY SCHOOL TEACHERS IN INDONESIA."

[36]Afifah et al., "Utilization of Artificial Intelligence to Improve the Quality of Learning in Elementary Madrasahs."

based on digital technology.[37]Other research highlights the importance of strengthening ethics and human values in the use of AI in educational settings. Sholihah and Aufa state that the dominance of digital technology can lead to the dehumanization of education if learning is too oriented toward machine automation.[38]Hilmi and Hilmi added that values-based digital literacy is an urgent need to maintain a balance between technological intelligence and social empathy in Indonesian education.[39]These findings indicate that the development of AI presents two simultaneous trends: increased learning efficiency and the risk of weakening the humanistic dimension of education. This situation makes human-centered learning a crucial approach in maintaining a human-centered orientation in education.

Table 1. Thematic Distribution of Literature on the Transformation of Educator Competencies in Human-Centered Learning in the Artificial Intelligence Era

No	Focus of Literature Review	Literature Findings Trends
1	AI-based pedagogical competence	The literature emphasizes the need for transformation of teachers' pedagogical competencies through the integration of AI in adaptive, reflective, and personalized learning.
2	Human-centered learning	The study aims at learning that places empathy, human values, and social relations at the core of the educational process.
3	Digital literacy and AI teachers	Most of the articles highlight the urgency of AI literacy and digital literacy as new competencies for educators.
4	Teacher professionalism and identity	The literature shows a shift in the professional identity of teachers from being material deliverers to being technology-based humanist learning facilitators.
5	Ethics and humanization of technology	Research emphasizes the importance of strengthening ethics, morality, and controlling dehumanization due to AI dominance.
6	AI-based learning innovation	The article discusses the implementation of AI in media, modules, and adaptive learning systems.
7	Professional development of teaching staff	Studies show that training, academic supervision, and reflective mentoring are the main strategies for transforming teacher competency.

Based on the results of the literature analysis, the distribution of studies is not directed at quantitative statistical measurements, but rather at mapping the trends in themes and patterns of academic discourse developing in research on educator

[37]Sejati et al., "The Role of AI in MIPA Learning Innovation in Schools."
[38]Sholihah and Aufa, "Humanization of Technology in Education."
[39]Hilmi and Hilmi, "VALUES-BASED DIGITAL LITERACY."

competency in the era of Artificial Intelligence. The findings show that the majority of articles place the transformation of pedagogical competency and AI literacy as the main focus, while the human-centered learning dimension develops in response to concerns about the dehumanization of digital education. These studies demonstrate that the integration of AI in education is not only understood as a technological innovation, but also as a shift in the learning paradigm that demands a balance between digital skills and human values. The literature also shows that teachers are positioned as strategic actors in maintaining the dimensions of empathy, ethics, interpersonal communication, and reflective learning amidst the penetration of artificial intelligence systems. Other findings indicate a strong tendency towards continuous professional development through AI training, academic supervision, and reflective practice as a form of adaptation to Society 5.0. This condition confirms that the transformation of educator competency is no longer limited to technological mastery, but is moving towards humanistic competency based on human-centered learning that places humans at the center of the digital education ecosystem.[40]

Transformation of Teacher Competence from a Human-Centered Learning Perspective

The results of the literature synthesis indicate that the transformation of educator competencies in the era of Artificial Intelligence is moving toward a human-centered learning paradigm that positions teachers as the bridge between technology and human values. Hakim explained that human-centered learning emphasizes personalized, reflective, and student-centered learning.[41]This finding was reinforced by Jamil who stated that the human-centered design approach in education is able to create more meaningful and contextual learning experiences.[42]Educators' competencies are no longer solely focused on technical teaching skills, but also encompass empathetic communication skills, AI literacy, digital leadership, and strengthening student character. Fernandes et al. found that optimizing AI based on human-centered principles can help teachers develop more adaptive and ethical teaching modules.[43]This situation demonstrates that AI is not viewed as a replacement for teachers, but as a supporting tool in developing more humanistic learning. This perspective demonstrates that educators in the AI era must be competent in integrating technological intelligence with emotional and social intelligence.

Further analysis shows that the transformation of teacher competencies is influenced by the development of generative AI, which is changing patterns of classroom learning interactions. Kurniawan et al. explain that the use of generative AI helps teachers accelerate the development of learning materials and media more

[40] Fernandes et al., "Optimization of Artificial Intelligence (AI) Based on Ethical and Human-Centered Principles in the Preparation of Teaching Modules for Teachers in Tanah Datar Regency"; Hakim, "Planning of Islamic Education Learning Systems Based on Human-Centered Learning in Improving the Quality of Learning."

[41]Hakim, "Planning of Islamic Education Learning System Based on Human-Centered Learning to Improve Learning Quality."

[42]Jamil, "HUMAN-CENTERED DESIGN BASED EDUCATION MANAGEMENT TO CREATE PERSONAL AND MEANINGFUL LEARNING EXPERIENCES."

[43]Fernandes et al., "Optimization of Artificial Intelligence (AI) Based on Ethical and Human-Centered Principles in the Preparation of Teaching Modules for Teachers in Tanah Datar Regency."

creatively.[44]Rochmad et al. also found that the use of AI improves teachers' work efficiency in administration and learning evaluation.[45]However, several studies have shown serious challenges related to ethics, professional identity, and human relations in digital education. Ramadhan and Herdiyana state that the use of generative AI has shifted teachers' professional identity from being knowledge centers to facilitators of collaborative learning.[46]Salam and Ismail added that character education has the potential to degrade if technology is used without strengthening moral and spiritual values.[47]These findings demonstrate that teacher competency transformation is inextricably linked to reflective and ethical skills in addressing developments in educational technology. This demonstrates that human-centered learning is a crucial foundation for maintaining a balance between digital innovation and character development.

Table 2. Forms of Transformation of Educator Competencies

Traditional Competence	**Transformational Competencies in the AI Era**
Knowledge transfer	Learning facilitator
Mastery of the material	AI and digital literacy
One-way teaching	Collaborative learning
Manual evaluation	Technology-based evaluation
Teacher authority	Empathetic communication
Basic pedagogical competencies	Human-centered pedagogy

The findings in this table indicate that the transformation of teacher competencies is moving toward an integration of digital technology and a humanistic approach. Teachers are no longer positioned merely as conveyors of information, but as learning mediators capable of building meaningful interactions between humans and technology.

The Meaning of Teacher Competency Transformation in the Artificial Intelligence Era

Interpretation of research results indicates that the transformation of educator competencies in the Artificial Intelligence era is not simply about mastering digital technology but also demands a reconstruction of a more humanistic and reflective educational paradigm. Rofiq et al. explain that the transformation of deep learning-based learning from a digital humanism perspective places humans at the center of the

[44]Ardiyarso Kurniawan, Yustina Priska Kisnanto, and Dwi Hosanna Bangkalang, "Using Generative AI in the Classroom for Teachers,"*Journal of Community Service for National Development*6, no. 2 (December 2025): 2058–64, https://doi.org/10.46306/jabb.v6i2.2053.

[45] Rochmad, Nasar, and Mujiono, "The Impact of Artificial Intelligence Utilization on Work Efficiency and Productivity of Secondary School Teachers."

[46]Ramadhan and Herdiyana, "The Role of Teachers in the Generative AI Era."

[47] Salam and Ismail, "Reflection on Educational Philosophy in Facing the Challenges of Character Education in the Era of Artificial Intelligence."

digital education process.[48]This perspective is reinforced by Rahmawati et al., who stated that the development of AI has shifted the learning architecture from digital assistance to human-machine co-evolution in education.[49]This situation demonstrates that the relationship between humans and technology in education is no longer subordinate, but rather collaborative and complementary. Human-centered learning is a strategic approach to ensure that AI integration remains oriented toward developing students' values, empathy, creativity, and social awareness. This transformation demonstrates that the competence of future educators will be greatly influenced by their ability to balance technological sophistication with the human dimension of learning. This change also demonstrates that teachers retain a central position as key actors in education despite the massive development of AI technology.

The research findings also revealed an unexpected pattern of increasing need for ethical and spiritual competencies in teachers in the face of AI developments. Aminuddin explained that the concept of human integrity in Islamic education is crucial in response to the dominance of artificial intelligence in human life.[50]Sayekti et al. found that teacher competencies in the AI era must include strengthening religious ethics and digital ethics to maintain a morally meaningful educational direction.[51]This situation indicates that the transformation of educator competency is not only focused on the technological and pedagogical dimensions, but also touches on the philosophical and spiritual aspects of education. However, this study has limitations because most of the literature analyzed is still conceptual studies and literature reviews, thus lacking empirical field research. Furthermore, research on human-centered learning in the context of AI in Indonesia is still relatively limited compared to studies on AI literacy and the digital transformation of education. These limitations open up opportunities for further research on the implementation of AI-based human-centered learning at various levels of education in Indonesia. These findings emphasize that the future of education is determined not only by technological sophistication, but also by the ability of educators to maintain human values amidst the disruption of Artificial Intelligence.

[48]Rofiq, Wantari, and Ainah, "A Transformation of Islamic Religious Education Learning Based on Deep Learning."

[49]Dita Rahmawati et al., "Socio-Technical Analysis of AI Disruption: Transformation of Learning Architecture From Digital Assistance to Human-Machine Co-Evolution in Vocational Education," *SATESI: Journal of Science, Technology, and Information Systems* 6, no. 1 (April 2026): 20–28, https://doi.org/10.54259/satesi.v6i1.7351.

[50] Fajrian Aminuddin, "Systematic Literature Review: The Concept of Human Integrity in Islamic Educational Philosophy in the Era of Artificial Intelligence," *Kalam Al Gazali: Education and Islamic Studies Journal* 3, no. 1 (February 2026): 92–103.

[51]Siskha Putri Sayekti, Munakhiroh El Hajar, and Zaeni Dahlan, "Systematic Literature Review: Religious Ethics, Teacher Competence and Artificial Intelligence," *Proceeding ISETH (International Summit on Science, Technology, and Humanity)*, 2025, 1623–33.

Conclusion

The concluding section of this study confirms that the transformation of educator competencies in the Artificial Intelligence era has moved toward a human-centered learning paradigm that places humans at the center of the digital learning ecosystem. The results of the literature synthesis indicate that teacher competencies are no longer limited to conventional pedagogical skills, but have developed into multidimensional competencies that include AI literacy, digital ethics, empathetic communication, reflective leadership, and the ability to build technology-based collaborative learning. The integration of Artificial Intelligence in education has proven to provide significant opportunities for personalized learning, teacher work efficiency, and the development of adaptive learning innovations. This development also presents challenges in the form of the potential dehumanization of education if the use of technology is not balanced with the strengthening of moral values, social empathy, and ethical awareness. This condition demonstrates that human-centered learning is a strategic foundation in maintaining a balance between technological sophistication and the human dimension in future education. The findings of this study provide theoretical contributions by strengthening the digital humanism perspective in the transformation of educator competencies and practical contributions as a reference for the development of teacher training, AI literacy, and technology-based education policies that remain oriented towards human character development.

This study also shows that the implementation of educator competency transformation needs to be carried out gradually through strengthening digital literacy, integrating AI into learning, developing humanistic pedagogy, and strengthening collaboration between humans and technology in the educational process. Teachers are positioned as central and irreplaceable actors in building reflective, contextual, and meaningful learning experiences amidst the increasingly massive development of artificial intelligence. However, this study still has limitations because most of the sources analyzed are conceptual studies and literature reviews, thus not fully describing the empirical implementation of AI-based human-centered learning in the field. Studies on AI integration in Indonesian education also still predominantly discuss the technological aspects rather than the humanistic and philosophical dimensions of education. This condition opens up opportunities for further research through an empirical approach at various educational levels and in different social contexts. Future research is expected to be able to develop a more contextual, ethical, and sustainable implementation model of AI-based human-centered learning in facing the dynamics of Society 5.0 and global educational transformation.

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