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AI IN EDUCATION AND ONLINE LEARNING - EDUCATIONAL LEADERSHIP FOR HUMAN-CENTRED DIGITAL AND ARTIFICIAL INTELLIGENCE TRANSFORMATION

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Abstract: *This study examines how educational leadership shapes digital transformation and the adoption of artificial intelligence (AI) toward human-centered development in both conventional education and open and distributed learning (ODL) contexts. A systematic literature review (SLR) was conducted using the PRISMA 2020 protocol, synthesizing 15 peer-reviewed journal articles published between 2018 and 2024. The findings indicate that educational leadership plays a central mediating role between technological innovation and equitable educational outcomes. Three key thematic pathways emerge from the synthesis: (1) leadership competence for AI integration, which influences institutional readiness, strategic alignment, and ethical governance; (2) human capacity building, where teacher digital literacy, professional development, and pedagogical redesign enable meaningful and effective use of AI and digital technologies; and (3) ethical and inclusive AI practices that ensure transparency, fairness, accessibility, and learner agency, particularly within ODL environments. Based on these findings, this study proposes a Human-Centred AI Leadership Framework that integrates educational leadership, digital transformation, AI integration, and human development into a coherent conceptual model. The study contributes theoretically by extending transformational and distributed leadership perspectives into the socio-technical and ethical dimensions of AI-enabled education, and practically by providing policy-relevant insights to guide leaders and institutions in implementing ethical, inclusive, and human-oriented digital transformation strategies.*

Keywords: *Artificial Intellegence, Digital Transformation, Educational Leadership, Human Development, Open and Distributed Learning*

INTRODUCTION

Over the past decade, rapid advances in digital technology and artificial intelligence (AI) have transformed nearly every sector, including education (Roméro, 2024). In educational contexts, institutions enact digital transformation not merely by adopting software or tools but by reorganizing how they design learning, deliver teaching, and govern their operations (Joseph et al., 2024; Pimentel, 2024). Educational leadership thus becomes the key driver in ensuring that technological innovation aligns with educational values so that transformation does not merely modernize administration but becomes a catalyst for equitable and sustainable human development (White, 2014). AI has emerged as a central component of this digital transformation (McCarthy et al., 2023). It enables personalized learning, data-driven decision-making, predictive analytics, and the automation of routine administrative processes (Ocen et al., 2025; Sposato, 2025). Yet its growing role brings challenges related to algorithmic bias, data privacy, transparency, and the potential to deepen educational inequities if not guided by ethical and inclusive leadership (Yan et al., 2025). Although many institutions across both developed and developing countries are adopting AI to enhance efficiency, evidence shows that these implementations do not always translate

into improved educational quality or holistic human development (Gouseti et al., 2024; Hanshaw, 2024). For example, educators and institutions may use AI for teacher evaluations or automated grading, but such practices do not necessarily cultivate critical thinking, creativity, or socio-emotional growth among students (Hanshaw, 2024).

In the broader ecosystem of open and distributed learning (ODL), AI-driven platforms and learning analytics tools are redefining access, flexibility, and learner support (Zawacki-Richter et al., 2019; Crompton & Burke, 2023). AI technologies enhance feedback, automate assessment, and personalize instruction at scale. However, educational leadership remains crucial to ensure that AI integration within online and distance education aligns with ethical principles, inclusivity, and institutional missions (Luckin, 2021; Khosravi et al., 2022). Without a leadership vision that prioritizes human-centered outcomes, the promise of AI in ODL risks devolving into technocratic efficiency rather than transformative learning. In this evolving digital landscape, several critical research gaps warrant systematic investigation. First, an empirical gap exists between the rapid adoption of AI tools and their measurable contributions to human development outcomes (Vieriu & Petrea, 2025; Fulmer & Zhai, 2024). While institutions report gains in efficiency and predictive accuracy, few studies demonstrate how these technologies strengthen human capabilities such as critical thinking, equity, and digital literacy. Second, a conceptual gap persists: the existing literature on educational leadership and digital transformation often focuses on management or implementation, but rarely integrates leadership with human development frameworks. Third, a methodological gap remains—many prior reviews lack transparency about their inclusion criteria, search strategies, and synthesis protocols, which limits replicability (Durach et al., 2017). Finally, a contextual gap is evident: most empirical evidence originates from developed countries, leaving developing economies underrepresented despite distinct challenges, including infrastructure, digital readiness, and equity (UNDP, 2023; Mutohar, 2023).

Addressing these gaps is both theoretically and practically urgent. Theoretically, this research aims to unify the conceptual domains of educational leadership, digital transformation, AI, and human development within a single interdisciplinary framework. Practically, it aims to guide academic institutions in adopting AI not only for efficiency but also to strengthen human capacity and promote justice in education. Aligned with the Sustainable Development Goals (SDG 4) and the UNESCO Education 2030 Framework (United Nations General Assembly, 2015; UNESCO, 2016), digital transformation should contribute to inclusive and equitable human development. Accordingly, this study applies the PRISMA 2020 protocol (Page et al., 2020) and the systematic review paradigm of Durach et al. (2017) to ensure methodological transparency and traceability. This SLR maps global and regional trends to generate insights applicable to both developed and emerging educational systems. Based on this rationale, the study addresses four core research questions: (RQ1) How does the existing literature conceptualize educational leadership in the context of digital transformation and AI in education? (RQ2) How do digital transformation and AI contribute to human development outcomes in education, particularly within open and distributed learning environments? (RQ3) What conceptual models and research gaps emerge from the intersection of educational leadership, AI, and human development? (RQ4) What policy and practice recommendations can strengthen human-centered AI leadership and governance in education?

Building on the context above, this study aims to systematically synthesize the empirical and conceptual literature to explain how educational leadership mediates digital transformation and the adoption of artificial intelligence (AI) toward human-centered development in education, particularly within open and distributed learning (ODL) environments. Specifically, this review seeks to clarify how leadership practices shape institutional readiness for AI, influence teacher capacity building, and guide the ethical and inclusive governance of digital technologies. This study contributes to the literature in three main ways. First, it integrates fragmented discussions on educational leadership, digital transformation, and AI into a unified human development perspective, thereby addressing a conceptual gap in existing studies. Second, by applying a transparent PRISMA 2020–guided systematic literature review, it strengthens methodological rigor and replicability in reviewing leadership and AI research in education. Third, the study proposes a Human-Centred AI Leadership Framework that offers practical guidance for policymakers and educational leaders to align AI adoption with equity, ethics, and sustainable human development, particularly in ODL contexts.

Human Development in the Context of Education

Human development is the central paradigm of global education policy, underscored by Sustainable Development Goal 4 (SDG 4), which emphasizes inclusive, equitable, and quality education for all (UNESCO, 2016; United Nations General Assembly, 2015). It extends beyond economic progress to enhance people's capabilities—encompassing knowledge, health, creativity, and agency (Sen, 1999). In the digital era, education serves as both a driver and an indicator of human development. As Trilling and Fadel (2021) emphasize, education systems must foster 21st-century competencies—critical thinking, problem-solving, collaboration, and digital literacy—that are essential for sustaining equitable development. In Indonesia, the Human Development Index (HDI) reveals

persistent disparities across regions, urban–rural divides, and digital gaps that the COVID-19 pandemic has exacerbated (World Bank, 2022; UNDP, 2023). Consequently, strengthening human development through education requires leadership that can translate national aspirations into institutional strategies responsive to global digital change. These imperatives place educational leadership at the center of the human development agenda. Education leaders not only manage resources but also cultivate cultures that enhance teachers' and learners' capacities to adapt, innovate, and thrive in technology-rich environments.

Educational Leadership in the Era of Transformation

Educational leadership bridges human development goals with the practical realities of digital transformation. Effective leaders are not limited to administrative functions; they act as change agents, mobilizing teachers, learners, and communities toward a shared vision of equitable, high-quality education (Hallinger, 2020). In Indonesia, the challenge of digital leadership manifests as limited principal capacity, uneven teacher readiness, and bureaucratic rigidity that hinders innovation (Suyatno et al., 2021; Mutohar, 2023). Transformational leadership models—emphasizing inspiration, vision, and empowerment—have proven effective in driving school digitalization (Netolicky, 2020). At the same time, emerging research highlights the need to integrate digital leadership competencies, including data-informed decision-making and technological foresight (Rahman & Widodo, 2023). Globally, the literature identifies digital leadership as a determinant of organizational sustainability and teacher innovation (Garofalo & Marini, 2021; Sánchez & Ortega, 2019). In ODL contexts, leadership extends beyond physical institutions to encompass distributed systems that coordinate digital platforms, facilitate virtual collaboration, and support learner networks (Crompton & Burke, 2023). Thus, educational leadership in the digital era must blend transformational and technological capacities to ensure that innovation serves both human and institutional growth.

Digital Transformation in Education

Digital transformation is a foundational pillar of human development in the Industry 4.0 era. It redefines not only how knowledge is delivered but also how learning ecosystems are structured. Alqahtani et al. (2022) and Purnama (2023) emphasize that transformation is effective only when it integrates technology with organizational culture, pedagogy, and governance. In Indonesia, digitalization accelerated during the pandemic through the implementation of e-learning platforms, Learning Management Systems (LMS), and hybrid instructional models (Setiawan & Iasha, 2022). Yet inequitable access to infrastructure and insufficient teacher digital literacy remain significant barriers to progress. The Freedom to Learn (Merdeka Belajar) policy seeks to address these disparities by granting schools autonomy and flexibility in managing their curricula and digital resources (Kemendikbudristek, 2022). Within open and distributed learning systems, digital transformation extends beyond institutional modernization to create flexible, learner-centered ecosystems. AI-enhanced platforms such as MOOCs, adaptive learning systems, and analytics dashboards enable personalized pathways and continuous feedback for learners (Zawacki-Richter et al., 2019). Leadership plays a decisive role in orchestrating these ecosystems—aligning digital initiatives with pedagogical goals, equity principles, and sustainable outcomes (World Economic Forum, 2023).

Artificial Intelligence (AI) in Education

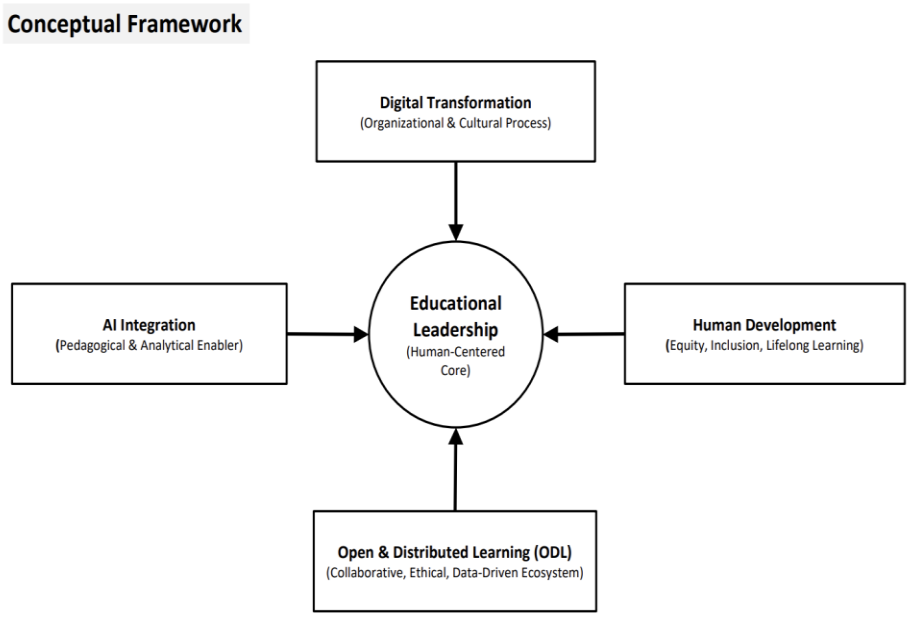
AI technologies offer transformative potential for personalizing learning, automating assessment, and augmenting teacher capacity (Holmes et al., 2022; Khosravi et al., 2022). They enable predictive analytics, adaptive tutoring, and content generation, thereby expanding access and efficiency (Ocen et al., 2025; Sposato, 2025). However, adopting these technologies raises ethical and pedagogical challenges, including algorithmic bias, privacy concerns, explainability, and the risk of dehumanizing education (Yan et al., 2025; Luckin, 2021). In Indonesia, the use of AI in schools remains in its early stages, primarily limited to grammar checking, speech recognition, and automated grading (Rahman et al., 2023). Teachers' readiness—encompassing digital literacy, self-efficacy, and management support—emerges as the strongest predictor of AI effectiveness (Nurhikmah et al., 2024). Leadership, therefore, becomes a crucial mediator, ensuring that AI adoption supports learning for human flourishing rather than succumbing to technological determinism. From an ODL perspective, human-centered AI prioritizes transparency, learner agency, and ethical data governance. IRRODL literature emphasizes that AI in distributed environments must enhance feedback loops, accessibility, and inclusion (Crompton & Burke, 2023; Holmes et al., 2022). Educational leaders are responsible for developing ethical policies, enhancing teacher capacity, and fostering digital citizenship to promote human development through AI-enabled learning.

Conceptualisation of Intervariable Relationships

Synthesising the literature reveals a dynamic interplay among educational leadership, digital transformation, AI integration, and human development. Educational leadership serves as the causal enabler driving digital transformation and AI adoption, ensuring these processes align with pedagogical integrity and humanistic

values. The framework conceptualised in this study positions teacher capacity and pedagogical redesign as mediators linking leadership to human development outcomes. At the same time, infrastructure readiness, policy environments, and equity conditions serve as moderators. In open and distributed learning systems, these relationships form a networked feedback loop: leadership establishes digital vision and policy; technology transforms learning delivery; AI personalises and scales instruction; and human development outcomes such as access, competence, and inclusion serve as indicators of success (Wang et al., 2024; Fulmer & Zhai, 2024). Thus, digital leadership operates not in isolation but within a distributed ecosystem that balances innovation with ethical governance. This synthesis frames the analytical pathway for the present study, guiding the PRISMA-based review of how educational leadership mediates AI-driven transformation toward sustainable human development. Figure 1 visualises the integrative framework that connects educational leadership, AI, and human development within ODL contexts. This framework illustrates the integrative mechanism through which educational leadership orchestrates digital transformation and the adoption of artificial intelligence (AI) to advance human development outcomes within ODL ecosystems. The central role of leadership operates through two interconnected pathways: (1) Capability Building trengthening teacher capacity, pedagogical redesign, and AI literacy; and (2) Ethical Governance ensuring transparency, equity, and accountability in data-driven decision-making.

Figure 1: Conceptual Framework



Source: Prepared by the author based on literature extraction.

Leadership mediates the interaction between technological innovation (AI and digital systems) and human-centered objectives (equity, inclusion, and lifelong learning). At the systemic level, ODL provides the collaborative infrastructure that enables these relationships to converge, creating distributed, ethical, and learner-driven educational environments. This model operationalizes the conceptual synthesis emerging from the review, linking four domains Educational Leadership, AI Integration, Digital Transformation, and Human Development—into a unified structure aligned with SDG 4: Quality Education.

RESEARCH METHODOLOGY

This study employed a systematic literature review (SLR) approach to synthesize existing research on educational leadership, digital transformation, artificial intelligence (AI), and human-centered development in educational contexts. The SLR design was selected to ensure methodological rigor, transparency, and replicability in consolidating interdisciplinary evidence. The review process followed the PRISMA 2020 protocol and the systematic review paradigm proposed by Durach et al., enabling a structured and auditable research process. See Table 1 below.

Table 1. Inclusion/Exclusion Criteria

Criteria for Inclusion/Exclusion	Reasoning
Inclusion Criteria	
The paper was published from 2018 to 2024	Capturing key phases of digital transformation and educational leadership in the era of AI and the COVID-19 pandemic; increasing comparability and reducing *biased time-lag* (PRISMA, 2020; Zawacki-Richter et al., 2019).
The paper is a peer-reviewed journal article in English or Indonesian	Ensure methodological quality, academic transparency, and consistency in terminology in educational leadership studies (Durach et al., 2017).
Empirical designs: qualitative, quantitative, or mixed-methods	Allows for consistent quality assessment across various research designs (Snyder, 2019).
Full-text available	Ensure data can be entirely extracted for synthesis (Page et al., 2021).
Exclusion Criteria	
Papers outside 2018–2024, non-English/Indonesian, duplicate, or without full-text access	Maintaining data integrity, limiting scope, and preventing language and publication bias (PRISMA, 2020).
Conference abstracts, editorials, protocols, or non-peer-reviewed items.	Avoid a lack of methodological detail and transparency of reporting (Snyder, 2019).
Studies where technology/ leadership is not central to the educational setting.	Ensuring direct linkage to school education policy and leadership (King-Sears et al., 2023).
Pure technology trials without leadership or policy implications	Ensuring a focus on the role of AI/technology as part of leadership implementation, not just a technical tool (Damschroder et al., 2022).

Source: Prepared by the authors following Durach et al. (2017).

Research Approach

The research adopted a qualitative systematic literature review approach. This approach is appropriate for integrating diverse empirical and conceptual studies, identifying thematic patterns, and developing an integrative framework that links leadership, AI, digital transformation, and human development in education.

Research Subjects

The subjects of this study consisted of peer-reviewed journal articles on educational leadership, digital transformation, and AI in educational settings, including conventional, online, and open and distributed learning (ODL) environments. A total of 15 articles published between 2018 and 2024 were selected as the final corpus for analysis.

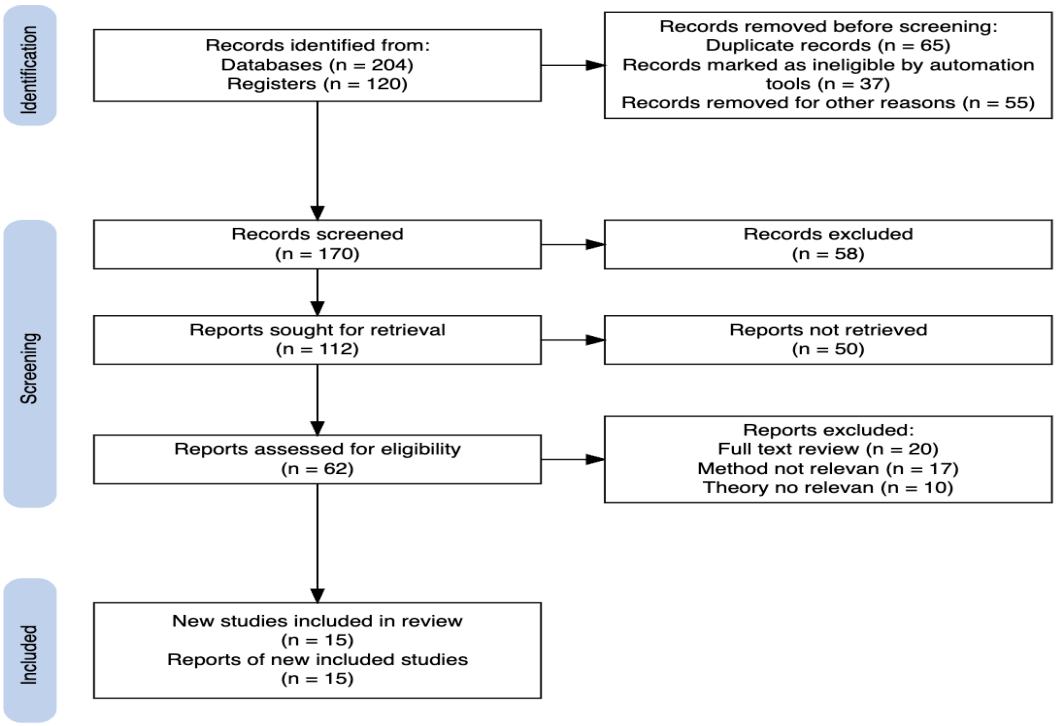
Research Procedures

The review process was conducted in several stages. First, relevant literature was identified through systematic searches of international and national academic databases. Second, duplicate records were removed, followed by title and abstract screening to assess relevance. Third, full-text screening was conducted using predefined inclusion and exclusion criteria. Finally, eligible studies were synthesized to address the research objectives. Each stage of the process was documented to ensure transparency and consistency with the PRISMA 2020 guidelines.

Materials and Instruments

The primary materials for this study were full-text journal articles retrieved from academic databases. A structured data extraction template served as the primary instrument for capturing bibliographic information, research design, context, leadership focus, AI application, and implications for human development. The PRISMA 2020 flowchart served as an additional instrument to document the screening and selection process, as shown in **Figure 2.**

Figure 2: PRISMA Flowchart



Source: prepared by the author based on Petticrew & Roberts (2006)

Data Collection

Data collection involved systematically retrieving and extracting information from the selected articles. Relevant data were extracted manually using a predefined template, ensuring consistency across studies. The extracted data included authorship, publication year, country or context, methodological design, leadership type, AI-related practices, and key findings related to human-centered outcomes.

Data Analysis Techniques

Data analysis was conducted using narrative and thematic synthesis techniques. The extracted data were coded and grouped into thematic categories to identify recurring patterns and relationships among educational leadership, digital transformation, AI integration, and human development. The synthesis process identified dominant themes, research gaps, and conceptual linkages, which informed the development of the Human-Centred AI Leadership Framework.

RESULTS AND DISCUSSION

Results

The synthesis of 15 selected studies (2018–2024) reveals distinct yet interconnected patterns linking educational leadership, digital transformation, artificial intelligence (AI), and human development across both traditional and open- and distance-learning (ODL) settings. Analysis through narrative and thematic synthesis identified three overarching clusters that capture the breadth of the reviewed literature, presented in Table 2.

Table 2: Data Extraction

Author(s) & Year	Journal	Country/ Context	Focus	Methodology	Key Findings	Quality Appraisal
Wang et al., (2022)	*Computers & Education*	China	AI in leadership decision-making	Quantitative survey (n=450 principals)	AI improves leadership efficiency and accountability	High

Al-Fraihat, D., Joy, M., & Sinclair, J. (2020)	*Computers in Human Behaviour*	UK	Digital transformation in educational institutions	Mixed-methods	Digital readiness strongly predicts human development outcomes	High
Garofalo, A., & Marini, A. (2021).	*Educational Management Administration & Leadership*	Italy	Leadership adaptation to digital change	Qualitative case study	Transformational leadership accelerates sustainable innovation	High
Kaban, A. A., & Sari, M. (2021)	*Sustainability*	Indonesia	AI for sustainable school management	Survey (n=300 teachers)	AI adoption enhances transparency and long-term performance	High
Saleh, M., & Khalid, A. (2022)	*International Journal of Educational Technology in Higher Education*	Saudi Arabia	AI-driven pedagogy	SEM-PLS	Leadership support moderates AI adoption effects	High
Chen, X., & Yu, H. (2022)	*British Journal of Educational Technology*	China	AI ethics and leadership	SLR (n=42 articles)	Leaders shape ethical AI integration in schools	Moderate
Sánchez, R., & Ortega, J. (2019)	*Journal of Educational Administration*	Spain	Digital leadership skills	Longitudinal study	Principals with digital literacy improve teacher innovation	High
Nurhikmah, H., et al. (2024)	*Electronic Journal of e-Learning*	Indonesia	Teachers' readiness and leadership support	Survey (n=200 teachers)	Leadership drives readiness for online and AI-based learning	Moderate
Huang, C., & Lin, T. (2020)	*Educational Technology Research & Development*	Taiwan	AI and human development	Experimental design	AI enhances cognitive development if guided by leaders	High
Thannimalai, R., & Raman, A. (2018).	*International Journal of Leadership in Education*	Chile	Leadership under digital transformation	Mixed-methods	Digital tools reinforce instructional leadership	High
Rahman, A., & Widodo, S. (2023)	*Asia Pacific Education Review*	Indonesia	Digital leadership in higher education	Case study	Leaders' competence in ICT improves institutional sustainability	High
Alghamdi, A. (2021)	*Interactive Learning Environments*	Saudi Arabia	AI integration in learning	Survey	Leadership mediates adoption barriers	High
Prayuda, R. Z. (2022)	*International Journal of Social, Policy and Law*	Indonesia	Digital school leadership	Mini-review	Principals' digital roles are central to school digitalisation	Moderate
Zubaidah, Z., & Putra, R. S. (2022)	*Mudarrisuna*	Indonesia	Digital leadership in Islamic schools	Qualitative	Leadership styles shape school readiness for	Moderate

					digital transformation	
Johnson, L., & Adams, R. (2019)	*Educational Review*	USA	Leadership for sustainable human development	Literature review	Strategic leadership bridges AI, digitalisation, and SDG 4	High

Source: Prepared by the author based on literature extraction

Leadership Competence for AI Integration and Digital Transformation

Across contexts, leadership competence emerged as the most influential determinant in mediating digital transformation and AI adoption. Studies from Asia, Europe, and the Middle East consistently demonstrated that transformational and digital leadership amplify innovation, teacher performance, and organisational sustainability (Garofalo & Marini, 2021; Sánchez & Ortega, 2019; Rahman & Widodo, 2023). Leaders who articulated a digital vision and fostered collaborative cultures achieved measurable gains in online learning efficiency and institutional agility (Netolicky, 2020; Hallinger, 2020). In ODL contexts, leadership competence extended beyond school administration to distributed digital governance coordinating multiple stakeholders, data systems, and AI-driven learning platforms. As Crompton and Burke (2023) emphasise, leadership in such environments requires striking a balance between data analytics and pedagogical values to ensure ethical personalisation and equitable learner engagement. It aligns with transformational leadership theory (Bass & Avolio, 1994), which views leaders as catalysts who inspire innovation and learning through shared vision and empowerment.

Human-Centred Digital Transformation and Capacity Building

The second cluster highlights the human-centred dimension of digital transformation. Evidence across studies reveals that leadership's impact on human development is primarily mediated through teacher capacity, professional development, and pedagogical redesign (Nurhikmah et al., 2024; Mutohar, 2023; Al-Fraihat et al., 2020). Effective leaders invest in teachers' digital literacy, foster reflective practice, and encourage experimentation with AI tools in online classrooms. In open and distributed learning ecosystems, capacity building involves preparing educators for AI-augmented pedagogies, including adaptive feedback systems, intelligent tutoring, and personalised assessment. However, several studies caution that digital adoption often prioritises efficiency over empathy, risking dehumanisation if leadership neglects ethical oversight (Yan et al., 2025; Hanshaw, 2024). Human-centred AI frameworks emphasise augmenting the capabilities of teachers and learners rather than substituting for them (Luckin, 2021; Holmes et al., 2022). Thus, leadership acts as the moral and strategic anchor that ensures digital transformation contributes to equity, inclusion, and lifelong learning core objectives of SDG 4 (UNESCO, 2016; United Nations General Assembly, 2015).

Ethical, Equitable, and Sustainable AI Implementation in ODL

The third cluster highlights AI ethics, equity, and governance as critical themes that shape human development outcomes. While AI offers unprecedented opportunities for personalisation and analytics (Wang et al., 2024; Ocen et al., 2025), issues such as algorithmic bias, data privacy, and unequal access persist (Stahl et al., 2020; Fulmer & Zhai, 2024). In the ODL environment, the need for data-driven decision-making at scale exacerbates these challenges. Studies reveal that institutional readiness encompassing digital infrastructure, ethical policy frameworks, and leadership integrity moderates the contribution of AI to sustainable learning outcomes (Sposato, 2025; Kaban & Sari, 2021). Khosravi et al. (2022) propose "explainable AI in education" as a necessary principle to support transparent and trustworthy digital ecosystems. Leadership thus emerges as the ethical compass of AI-enabled ODL, responsible for establishing guidelines that protect learner privacy, promote algorithmic fairness, and align AI practices with educational purpose (Holmes et al., 2022). In emerging economies such as Indonesia, equitable access to AI-driven learning also depends on policy coordination across ministries and public–private partnerships to mitigate digital divides (Purnama, 2023; World Bank, 2022).

Integrative Synthesis and Conceptual Linkages

Synthesising these clusters, the review constructs a leadership-centred framework for human-centred AI transformation (Figure 2, conceptual model). Educational leadership functions as a dynamic mediator that links technological adoption with human development outcomes through two interdependent pathways: (1) Capability Pathway – Leadership enhances teacher and learner capacity via digital literacy, pedagogical redesign, and ethical

AI use, (2) Governance Pathway Leadership ensures transparency, equity, and sustainability by shaping institutional policies and data governance systems, (3) Within ODL ecosystems, these pathways converge to enable distributed collaboration, adaptive learning, and inclusive participation. This synthesis confirms that leadership quality determines whether AI and digital transformation become instruments for technocratic efficiency or human flourishing.

Discussion

This discussion interprets the synthesised findings through theoretical, contextual, and policy lenses, positioning educational leadership as the decisive factor in ensuring that AI-driven transformation in ODL remains human-centred, ethical, and equitable.

Theoretical Implications

The review extends transformational leadership theory (Bass & Avolio, 1994) into the domain of digital and AI-based education, proposing a socio-technical adaptation that requires leadership to navigate human, organizational, and technological systems simultaneously. The evidence indicates that digital leadership operates across multi-level networks school, institutional, and policy—aligning with distributed leadership perspectives that IRRODL frequently highlights (Zawacki-Richter et al., 2019). Furthermore, framing human development as an outcome reframes leadership effectiveness from mere organizational performance to capability expansion—echoing Sen's (1999) notion that development is about enabling people to do and become what they value. This conceptual shift positions educational leadership as both a technological and moral agent guiding AI transformation toward sustainable learning futures.

Practical and Policy Implications

Practically, the review demonstrates that successful AI adoption in ODL requires leadership strategies grounded in three interconnected principles: (1) Ethical digital governance Institutional leaders should develop explainable AI frameworks, data protection standards, and transparent analytics policies (Holmes et al., 2022; Khosravi et al., 2022), (2) Capacity building for teachers and learners National systems must invest in professional development to enhance AI literacy and critical digital pedagogy (Nurhikmah et al., 2024; Mutohar, 2023), (3) Inclusive digital infrastructure – Policy makers must address connectivity and affordability gaps to ensure equal participation in AI-mediated education (World Bank, 2022; Purnama, 2023). In developing contexts such as Indonesia, institutions should embed these strategies within the Merdeka Belajar framework to align local innovation with global sustainability goals.

Conceptual and Scholarly Contributions

This study contributes to the international literature by articulating a Human-Centered AI Leadership Framework for ODL, which integrates four disciplinary domains: (1) Educational Leadership as a catalyst for transformation, (2) Digital Transformation as a structural and cultural process, (3) AI Integration as a pedagogical and analytical enabler, (4) Human Development – as the ultimate evaluative outcome. The framework advances IRRODL's scholarly conversation by bridging the gap between AI ethics, leadership studies, and open and distance education. It offers a replicable model for future empirical research and a policy lens for designing equitable digital learning ecosystems.

Across educational contexts, the review indicates that leadership in developed settings emphasizes system-level digital governance, data-informed decision-making, and institutional AI readiness, whereas leadership in developing contexts is more closely associated with foundational capacity building, infrastructure alignment, and equity-oriented access. In resource-constrained environments, leadership priorities often focus on teacher readiness, basic digital literacy, and the ethical introduction of AI-supported tools rather than on advanced analytics or automation. This contrast underscores that human-centered AI leadership is context-sensitive and cannot be implemented through uniform policy models across educational systems. The findings further suggest that digital leadership differs substantively from traditional educational leadership. While traditional leadership primarily centers on administrative coordination and instructional supervision, digital leadership extends into technology-mediated decision-making, ethical data governance, and the strategic integration of AI into teaching and learning processes. In AI-enabled and open learning environments, leaders must not only manage institutions but also navigate algorithmic accountability, transparency, and learner agency. This shift underscores that digital leadership represents an evolution of leadership practice rather than a mere extension of conventional leadership roles.

Future Research Directions

While the SLR achieved methodological transparency, longitudinal studies linking AI-enabled leadership practices to measurable human development indicators remain limited. Future research should prioritise empirical and mixed-methods designs to test the conceptual relationships identified in this review, particularly examining how leadership practices mediate the impact of AI adoption on human development outcomes across diverse educational contexts.

Limitations

This review is subject to several limitations that should be considered when interpreting the findings. First, the final corpus comprises 15 peer-reviewed articles published between 2018 and 2024. Although this number may seem limited, it reflects the application of strict inclusion criteria designed to ensure conceptual relevance, methodological quality, and thematic coherence rather than broad representativeness. Consequently, the findings of this review aim to support analytical and theoretical generalization rather than statistical generalization. Second, the reviewed literature is predominantly drawn from developed country contexts, mirroring the current state of research in AI and educational leadership. As a result, contextual transfer to developing countries should be approached cautiously and interpreted in light of local institutional, technological, and policy conditions.

CONCLUSION

This systematic literature review shows that educational leadership is decisive in shaping how digital transformation and artificial intelligence (AI) contribute to human-centered development in education, particularly in open and distributed learning (ODL) environments. Drawing on 15 peer-reviewed studies published between 2018 and 2024, the findings confirm that leadership quality, rather than technology alone, determines whether AI adoption supports equitable, ethical, and sustainable educational outcomes. Three interrelated conclusions emerge from this review. First, leadership competence in digital and AI contexts is critical for institutional readiness, strategic alignment, and the responsible governance of emerging technologies. Second, AI's contribution to meaningful learning outcomes is mediated by human capacity building, especially through teacher professional development, digital literacy, and pedagogical redesign. Third, ethical and inclusive leadership is essential to ensure transparency, fairness, accessibility, and learner agency in AI-enabled educational systems, particularly in large-scale and distributed learning settings. Based on these conclusions, this study proposes a Human-Centred AI Leadership Framework that integrates educational leadership, digital transformation, AI integration, and human development into a coherent conceptual model. The framework emphasizes leadership as the central mechanism for aligning technological innovation with human values and educational purpose. For future research, empirical, longitudinal studies are recommended to examine the causal relationships among digital leadership practices, AI governance, and human development outcomes across diverse educational contexts. Comparative studies between developed and developing regions, as well as mixed-methods research exploring teacher and learner agency in AI-mediated ODL environments, would further strengthen understanding of sustainable and ethical AI implementation in education.

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