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Artificial Intelligence in Education: A Review of Teacher Leadership and Student-Centred Learning for Effective Classroom Integration

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Abstract

The rapid global expansion of Artificial Intelligence (AI) in education highlights its importance for improving teaching quality and learning outcomes, yet its classroom impact remains inconsistent. Despite growing interest, the literature reveals practical gaps in effective pedagogical integration and theoretical gaps in fragmented, individual-focused models that overlook leadership and context. This review aims to synthesise existing research and develop an integrated understanding of the relationships between AI integration, teacher leadership, and student-centred learning. A structured literature review approach is applied to analyse empirical and theoretical studies. Findings indicate that AI adoption is often superficial, with limited linkage to pedagogical outcomes and insufficient attention to leadership, trust, and governance. The study contributes by proposing a coherent framework positioning teacher leadership as a mediating mechanism. The findings inform policy and professional development. However, reliance on existing literature limits generalisability, suggesting future research should employ quantitative and longitudinal designs.

Keywords: Artificial, Intelligence, Education, Teacher, Leadership, Student-Centred, Innovation

Introduction

Globalisation continues to reshape education systems by accelerating the diffusion of new technologies, pedagogical practices, and policy expectations across countries. Education systems are increasingly required to respond rapidly to global knowledge economies, emphasising innovation, adaptability, and measurable performance outcomes. Within this context, Artificial Intelligence (AI) has emerged as a transformative force in education, offering new possibilities for adaptive learning, intelligent tutoring, automated assessment, and predictive analytics (Wang et al., 2024). These developments have significantly altered expectations placed on schools, requiring them not only to adopt technological tools but also to demonstrate improved teaching quality and student outcomes. However, despite rapid expansion in AI-related educational research, evidence regarding its sustained impact on classroom practice remains uneven and context-dependent (Tan et al., 2024).

A key issue emerging from the literature is the imbalance between technological advancement and pedagogical integration. While AI tools are increasingly available, their use often remains superficial, focusing on administrative efficiency rather than deep instructional transformation. Studies indicate that teachers frequently utilise AI for lesson preparation or grading but struggle to integrate it meaningfully into student-centred pedagogies (Tan et al., 2024). This highlights a fundamental problem: the presence of technology does not automatically lead to improved teaching practice. Instead, effective integration depends on teacher capability, professional development, and contextual support systems.

Teacher-related factors are therefore central to understanding AI adoption in education. Research shows that teachers' trust in AI systems significantly influences their willingness to adopt and use such technologies. For instance, Nazaretsky et al. (2022) demonstrate that perceived reliability and professional alignment of AI tools directly affect teachers' readiness to integrate them into classroom practice. Furthermore, professional development plays a critical role in shaping teachers' confidence and competence, yet current literature suggests that training initiatives often lag behind technological advancements (Tan et al., 2024). This creates a mismatch between policy expectations and teacher preparedness.

The United Arab Emirates (UAE) provides a particularly relevant context for examining these issues. The UAE has positioned itself as a global leader in AI through its National Strategy for Artificial Intelligence 2031, which explicitly emphasises education as a key domain for AI integration (UAE Government, 2018). Schools are expected to incorporate AI into teaching and learning processes while preparing students for future digital economies. However, policy ambition does not automatically translate into effective classroom implementation. UNESCO (2023) highlights that AI adoption in education raises critical concerns related to governance, ethics, transparency, and teacher capability, particularly in rapidly evolving contexts like the UAE.

Another critical dimension is teacher leadership. AI integration is not solely a technical process but also an organisational and behavioural transformation. Teacher leadership plays a vital role in facilitating peer learning, shaping instructional norms, and sustaining innovation within schools (Lovett, 2023). Despite its importance, existing research often treats teacher leadership and AI adoption as separate domains, resulting in a lack of integrated empirical models that explain how leadership influences AI-enabled teaching practices.

Student-centred learning further complicates the picture. AI technologies are frequently associated with personalised learning, yet personalisation alone does not guarantee student-centred pedagogy. Student-centred learning requires active engagement, autonomy, and meaningful interaction, all of which depend on teachers' instructional decisions (UNESCO, 2023). Without strong pedagogical mediation, AI tools may reinforce passive learning rather than enhance student agency.

Overall, the literature reveals several key gaps. First, there is limited empirical evidence linking AI integration with teacher leadership and student-centred learning in a unified framework. Second, research often focuses on tools rather than teacher capability and professional practice. Third, governance, trust, and ethical considerations are insufficiently integrated into quantitative models. These gaps highlight the need for a theory-driven, quantitative investigation that examines how AI integration relates to teacher leadership and student-centred learning in real school contexts.

Therefore, the objective of this review paper is to synthesise existing literature and develop a conceptual understanding of the relationships between AI integration, teacher leadership, and student-centred learning. The expected outcome is a clearer theoretical and empirical foundation that can guide future quantitative research and inform policy and professional development strategies in AI-enabled education.

Literature Review

The rapid expansion of Artificial Intelligence (AI) in education has generated a growing body of literature that spans multiple disciplines, including educational technology, learning sciences, and policy studies. While this expansion reflects the increasing importance of AI as a transformative force in education, it has also resulted in conceptual fragmentation and uneven empirical development. Much of the existing literature remains descriptive, focusing on technological capabilities rather than critically examining how AI is enacted in real classroom contexts (Tan et al., 2024). Consequently, there is a need for a more integrated and theoretically grounded understanding of AI integration that connects technological adoption with teacher practice, leadership processes, and pedagogical outcomes.

This chapter critically reviews the literature to address this need. It moves beyond descriptive summaries by interrogating how key constructs—AI integration, teacher leadership, and student-centred learning—are conceptualised, operationalised, and empirically tested. It also evaluates the adequacy of dominant theoretical frameworks such as TAM, UTAUT, TRI, and self-efficacy in explaining AI adoption in school settings. The chapter ultimately identifies critical gaps that justify the development of an integrated quantitative model.

AI Integration in Education: Beyond Technological Determinism

The literature on AI in education is often characterised by technological optimism, where AI is positioned as a solution to longstanding challenges such as differentiated instruction, assessment efficiency, and student engagement (Wang et al., 2024). However, a closer examination reveals that this optimism is not always supported by robust empirical evidence. Many studies emphasise the capabilities of AI systems—such as adaptive learning or predictive analytics—without sufficiently examining how these capabilities are translated into classroom practice.

A key limitation in the literature is the tendency to conceptualise AI integration as a function of availability rather than enactment. For instance, OECD (2021) highlights that digital infrastructure alone does not guarantee improved learning outcomes, yet many empirical studies continue to measure AI adoption in terms of access or frequency of use rather than pedagogical depth. This creates a conceptual ambiguity: it becomes unclear whether AI integration reflects meaningful instructional change or merely superficial usage.

Furthermore, systematic reviews indicate that evidence of AI's impact remains uneven across contexts. Wang et al. (2024) note that while AI applications are expanding rapidly, their maturity varies significantly, with limited longitudinal evidence demonstrating sustained improvements in teaching or learning outcomes. Similarly, Tan et al. (2024) argue that research disproportionately focuses on tool development and application, while neglecting teacher capability and professional learning as critical determinants of successful integration. Critically, this imbalance reflects a broader issue of technological determinism in the literature—the implicit assumption that technology itself drives educational improvement. In reality, AI tools are mediated by teachers' decisions, beliefs, and contextual constraints. Without considering these mediating factors, claims about AI effectiveness risk being overstated or misleading. Therefore, AI integration must be reframed as a practice-based construct that captures how teachers interpret, adapt, and apply AI in their instructional work.

Teacher Leadership: A Missing Link in AI Adoption

Teacher leadership has been widely recognised as a key driver of school improvement, yet its role in AI integration remains underexplored. Traditional literature conceptualises teacher leadership as professional influence exercised through collaboration, mentoring, and instructional improvement (Lovett, 2023). This perspective aligns with distributed leadership theory, which emphasises leadership as a collective and practice-based phenomenon rather than a formal position (Hadi, 2024). Despite its relevance, most AI-related studies treat teacher leadership as peripheral or ignore it altogether. This omission represents a significant theoretical and empirical gap. AI integration is not merely a technical process; it involves organisational change, peer learning, and the development of shared practices within schools. These processes are inherently linked to leadership dynamics.

Empirical evidence outside the AI domain suggests that teacher leadership plays a crucial role in facilitating innovation. For example, Ghamrawi (2023) demonstrates that teacher leadership is associated with improved professional functioning and wellbeing, while Hsieh (2024) shows that leadership influences innovative behaviour through mediating factors such as self-efficacy. However, these findings are rarely integrated into AI adoption models. This disconnect raises important questions. If AI integration requires teachers to interpret complex data, adapt instructional strategies, and support colleagues, then leadership processes should be central to understanding how AI is implemented in practice. Yet, current models often focus on individual-level adoption (e.g., attitudes, intentions) without accounting for collective processes within schools. Critically, the absence of teacher leadership in AI research limits explanatory power. It reduces AI adoption to an individual decision rather than a socially embedded process. This limitation also has practical implications: without understanding leadership mechanisms, it becomes difficult to design effective professional development or school-level interventions.

Student-Centred Learning: Conceptual Ambiguity in AI Research

Student-centred learning (SCL) is frequently cited as a key benefit of AI in education, particularly in relation to personalised learning. However, the literature often conflates personalisation with student-centred pedagogy, leading to conceptual ambiguity. Personalisation refers to the ability of AI systems to adapt content, pacing, and feedback to individual learners (Kabudi et al., 2021). While this capability can support SCL, it does not inherently guarantee it. Student-centred learning is a broader pedagogical construct that includes learner autonomy, active engagement, and meaningful interaction (UNESCO, 2023). These elements depend on teacher facilitation rather than technology alone. This distinction is often overlooked in empirical studies. Many studies claim that AI enhances SCL based on system features rather than measured pedagogical practices. As a result, there is limited evidence linking AI integration to validated indicators of student-centred learning.

Moreover, there is a risk that AI may undermine SCL if used uncritically. UNESCO (2023) warns that over-reliance on automated outputs can reduce human agency and diminish opportunities for critical thinking and interaction. This highlights the importance of teacher mediation in ensuring that AI supports rather than replaces pedagogical processes. Therefore, the relationship between AI and SCL should not be assumed but empirically tested. It requires a framework that accounts for both technological capabilities and teacher practices.

Theoretical Frameworks: Strengths and Limitations

Technology Acceptance Model (TAM)

TAM remains one of the most widely used frameworks for explaining technology adoption. Its core constructs—perceived usefulness and perceived ease of use—have been validated across numerous contexts (Davis, 1989). In AI research, these constructs continue to predict teachers' intention to use technology. However, TAM has several limitations when applied to AI in education. First, it focuses primarily on individual cognitive evaluations, neglecting social and organisational factors. Second, it does not account for issues such as trust, ethics, or professional judgement, which are particularly relevant in AI contexts. As a result, TAM provides a useful but incomplete explanation of AI adoption.

UTAUT

UTAUT extends TAM by incorporating social influence and facilitating conditions (Venkatesh et al., 2003). This makes it more suitable for educational settings, where peer influence and institutional support play important roles. Nevertheless, UTAUT also has limitations. While it acknowledges social factors, it does not explicitly model leadership processes or professional learning dynamics. Additionally, its emphasis on behavioural intention may not fully capture the complexities of classroom enactment.

Technology Readiness Index (TRI)

TRI introduces dispositional factors such as optimism and innovativeness (Parasuraman & Colby, 2015). These factors are particularly relevant in explaining variation among teachers in adopting new technologies. However, TRI alone cannot explain contextual influences such as school culture or policy environment. It must be integrated with other frameworks to provide a comprehensive explanation.

Self-Efficacy Theory

Self-efficacy is a critical determinant of technology adoption and sustained use (Bandura, 2023). Teachers with higher self-efficacy are more likely to experiment with AI tools and persist despite challenges. Importantly, self-efficacy also interacts with other constructs. For example, it can mediate the relationship between perceived ease of use and actual usage. This highlights its importance in integrated models.

AI Integration, Teacher Leadership, and Student-Centred Learning

Table 1 presents a structured overview of empirical and review studies on AI in education, teacher leadership, and related constructs. However, the value of this table lies not in the listing of studies, but in what it reveals collectively about the state of knowledge and its limitations.

A clear pattern emerging from Table 1 is the dominance of review-based and conceptual studies (e.g., Wang et al., 2024; Tan et al., 2024; Kabudi et al., 2021). While these studies provide useful syntheses of AI applications, they also signal a lack of robust classroom-based empirical evidence. For instance, Wang et al. (2024) highlight rapid growth in AI applications but simultaneously report uneven evidence of impact. This suggests that the field is still in an exploratory phase, where technological possibilities are better understood than pedagogical outcomes. This limitation directly justifies the present study's focus on teacher-reported practices, rather than technological features.

Another critical observation is that many empirical studies rely on cross-sectional survey designs (e.g., Nazaretsky et al., 2022; Ghamrawi, 2023). While these studies provide valuable insights into perceptions such as trust or leadership, they often stop at direct associations. For example, Nazaretsky et al. (2022) demonstrate that trust predicts AI adoption, but do not examine how this adoption translates into instructional practices or student outcomes. Similarly, Ghamrawi (2023) confirms the importance of teacher leadership but does not connect it explicitly to technology use. This fragmentation indicates that key constructs are studied in isolation, rather than within an integrated explanatory model.

Furthermore, Table 1 reveals a conceptual disconnection between AI integration and teacher leadership. Studies on AI (e.g., Deng et al., 2019; Russell et al., 2020) primarily focus on system capabilities and efficiency gains, whereas leadership studies (e.g., Lovett, 2023; Hsieh, 2024) focus on professional influence and innovation. The absence of studies that explicitly connect these domains highlights a major gap: the lack of empirical models explaining how AI integration is socially mediated within schools.

Another important issue identified in Table 1 is the weak operationalisation of pedagogical outcomes, particularly student-centred learning. While several studies claim that AI supports personalised learning (Kabudi et al., 2021), few provide validated measures of student-centred practices such as autonomy, engagement, or interaction. This creates a risk of construct misalignment, where technological capabilities are assumed to produce pedagogical outcomes without empirical verification.

In addition, the table highlights the limited inclusion of governance and ethical considerations in empirical models. Although UNESCO (2023) and OECD (2021) emphasise the importance of transparency, data protection, and human agency, these factors are rarely operationalised in survey-based studies. This omission is critical because such concerns directly influence teachers' willingness to adopt AI tools.

Table 1
Summary of Empirical Literature on AI Integration, Teacher Leadership, and Student-Centred Learning

Author(s) & Year	Objective of Study	Methodology	Key Findings	Limitations
Wang et al. (2024)	Examine trends in AI in education	Systematic review	Rapid growth of AI applications; uneven evidence of impact across contexts	Limited classroom-based empirical validation
Tan et al. (2024)	Review AI in teaching and teacher professional development	Systematic review	Strong focus on tools; limited attention to teacher capability and PD	Lack of empirical linkage to classroom practice
Nazaretsky et al. (2022)	Investigate teachers' trust in AI	Survey	Trust significantly predicts willingness to adopt AI tools	Context-specific; no link to pedagogy
Kabudi et al. (2021)	Review adaptive learning systems	Systematic review	AI improves engagement and personalisation	Limited evidence of long-term learning outcomes
Deng et al. (2019)	Explore AI-supported learning analytics	Empirical study	AI supports data-driven instruction	Early-stage implementation; limited scalability
Russell et al. (2020)	Analyse AI tools in classroom practice	Case study	AI improves efficiency and feedback processes	Small sample; limited generalisability
Joshi et al. (2020)	Evaluate AI applications in education	Review	Mixed evidence on effectiveness	Lack of rigorous experimental studies
OECD (2021)	Assess digital transformation in education	Policy report	Outcomes depend on ecosystem, not tools alone	Not empirically tested
UNESCO (2023)	Provide AI governance guidelines	Policy framework	Emphasises ethics, transparency, human agency	Limited empirical application
Lovett (2023)	Examine teacher leadership	Conceptual study	Leadership supports instructional improvement	Not linked to AI context
Ghamrawi (2023)	Study teacher leadership outcomes	Survey	Leadership improves teacher functioning and wellbeing	No integration with technology use
Hsieh (2024)	Examine leadership and innovation	SEM study	Leadership influences innovation via mediators	Not AI-specific

Bao et al. (2024)	Investigate innovation climate	Quantitative study	School climate mediates leadership and innovation	Limited educational context
Scherer et al. (2019)	Analyse technology adoption models	Meta-analysis	UTAUT validated across contexts	Not AI-specific
Almarzooqi et al. (2024)	Examine AI use in UAE schools	Case study	AI adoption varies across schools; leadership matters	Limited quantitative evidence

Conceptual and Theoretical Foundations

Table 2 summarises key theoretical frameworks and constructs used to explain technology adoption and educational practice. Unlike Table 1, which focuses on empirical evidence, Table 2 highlights the conceptual building blocks of the study. However, a critical reading reveals that these frameworks, while valuable, are insufficient when used in isolation. A major strength of the theories presented in Table 2 is their ability to explain individual-level adoption behaviour. For example, TAM (Davis, 1989) and UTAUT (Venkatesh et al., 2003) provide well-established explanations for how perceived usefulness, ease of use, and social influence shape behavioural intention. These models have been widely validated and remain relevant in AI contexts. However, a key limitation is that these models are primarily cognitive and individualistic. They explain why a teacher may decide to use AI, but they do not explain how that use is translated into collective practice, leadership behaviour, or pedagogical outcomes. This limitation is particularly evident in educational settings, where teaching is inherently social and collaborative.

Similarly, TRI (Parasuraman & Colby, 2015) and self-efficacy theory (Bandura, 2023) introduce important dispositional and psychological dimensions. They help explain differences among teachers in readiness and confidence. However, they still focus on the individual teacher, without adequately addressing the organisational context in which teaching occurs. Another critical limitation identified in Table 2 is the lack of explicit attention to pedagogical constructs, particularly student-centred learning. While technology adoption models explain usage behaviour, they do not specify how such behaviour leads to improved teaching and learning practices. This creates a theoretical gap between adoption and impact. In addition, Table 2 highlights the growing importance of trust, ethics, and governance (Nazaretsky et al., 2022; UNESCO, 2023). These factors extend beyond traditional adoption models and reflect the unique challenges of AI in education. However, they are not fully integrated into classical frameworks, indicating the need for model extension.

Table 1
Conceptual and Theoretical Foundations

Author(s) & Year	Objective / Theory	Method / Approach	Key Insights	Recommendation for This Study
Davis (1989)	Technology Acceptance Model (TAM)	Quantitative model	Perceived usefulness & ease of use predict adoption	Include PU & PEOU as core predictors
Venkatesh et al. (2003)	UTAUT	Quantitative model	Social influence & facilitating conditions affect adoption	Incorporate social/leadership context
Parasuraman & Colby (2015)	Technology Readiness Index (TRI)	Survey-based model	Readiness influences adoption behaviour	Include innovativeness & readiness constructs
Bandura (2023)	Self-efficacy theory	Psychological theory	Confidence influences behaviour and persistence	Include teacher self-efficacy variable
Nazaretsky et al. (2022)	Trust in AI	Survey	Trust predicts adoption of AI tools	Consider trust as contextual factor
Tan et al. (2024)	AI & teacher PD	Review	PD gap limits effective integration	Include capability-building perspective
UNESCO (2023)	AI ethics in education	Policy framework	Emphasises transparency, governance, human agency	Acknowledge ethical context in interpretation
OECD (2021)	Digital ecosystem theory	Policy analysis	System-level factors influence outcomes	Consider school-level conditions
Kabudi et al. (2021)	Adaptive learning theory	Review	AI supports personalisation	Link AI to student-centred learning
Lovett (2023)	Teacher leadership theory	Conceptual	Leadership drives instructional improvement	Use teacher leadership as mediator
Ghamrawi (2023)	Teacher leadership outcomes	Survey	Leadership linked to professional outcomes	Strengthen leadership measurement
Hsieh (2024)	Leadership & innovation	SEM	Indirect effects via mediators	Support mediation modelling
Bao et al. (2024)	Innovation climate theory	Quantitative	Climate influences innovation outcomes	Include organisational perspective
Wang et al. (2024)	AI in education trends	Review	Uneven implementation across contexts	Focus on teacher-level enactment
Tan et al. (2024)	AI teaching research gap	Review	Overemphasis on tools vs pedagogy	Shift focus to instructional practice

Research Gap

The critical review of existing literature reveals that research on Artificial Intelligence (AI) in education has expanded rapidly; however, this growth has not been matched by conceptual integration or empirical depth. While numerous studies explore AI applications, teacher perceptions, and technological adoption, the evidence base remains fragmented and insufficient to explain how AI translates into meaningful classroom practice.

The first major gap concerns the conceptualisation of AI integration. Much of the literature treats AI integration as a function of access or frequency of use rather than as a practice-based construct reflecting pedagogical enactment. Studies frequently emphasise system capabilities such as adaptive learning or automated assessment, but they rarely examine how teachers interpret and apply these tools in real instructional contexts (OECD, 2021; Wang et al., 2024). This creates a disconnect between technological potential and actual classroom implementation. As a result, claims about AI effectiveness often lack empirical grounding in teaching practice.

The second gap relates to the lack of integration between AI adoption and teacher leadership. Although teacher leadership is widely recognised as a driver of instructional improvement and innovation (Lovett, 2023; Ghamrawi, 2023), it is seldom incorporated into AI-related research models. Existing studies on AI tend to focus on individual-level adoption factors such as perceived usefulness, ease of use, or trust (Nazaretsky et al., 2022), while leadership studies rarely address technology integration. This separation limits the ability to understand AI adoption as a socially mediated process within schools, where peer influence, collaboration, and professional learning play critical roles.

A third gap concerns the weak empirical linkage between AI integration and student-centred learning (SCL). While AI is often associated with personalised learning, the literature frequently conflates personalisation with student-centred pedagogy. Personalisation refers to system-level adaptation, whereas student-centred learning involves learner autonomy, engagement, and meaningful interaction (UNESCO, 2023). However, few studies operationalise or measure SCL using validated constructs, resulting in a lack of robust evidence connecting AI use to pedagogical outcomes (Kabudi et al., 2021). This creates a significant gap between technological claims and educational impact.

The fourth gap is related to theoretical limitations of existing models. Dominant frameworks such as TAM and UTAUT provide valuable insights into technology adoption but remain largely individualistic and cognitively oriented (Davis, 1989; Venkatesh et al., 2003). These models do not adequately capture organisational dynamics, leadership processes, or pedagogical transformation. Similarly, TRI and self-efficacy theory explain individual readiness and confidence but do not address how these factors interact within school environments (Parasuraman & Colby, 2015; Bandura, 2023). This indicates the need for an integrated framework that combines individual, social, and pedagogical dimensions. A fifth gap concerns trust, governance, and ethical considerations. Although recent studies highlight the importance of trust in AI adoption (Nazaretsky et al., 2022) and global frameworks emphasise transparency, accountability, and human agency (UNESCO, 2023), these factors are rarely incorporated into quantitative models. Given that AI involves data-driven decision-making and potential risks, ignoring these dimensions limits the explanatory power of existing research.

The sixth gap is methodological in nature. The literature is dominated by cross-sectional survey designs that focus on direct relationships between variables. While these studies provide useful insights, they rarely test mediating or explanatory mechanisms, such as how AI integration influences pedagogical outcomes through leadership processes. This limits the ability to develop actionable insights for policy and practice (Tan et al., 2024). Finally, there is a contextual gap, particularly in the UAE. Despite strong policy initiatives promoting AI integration in education (UAE Government, 2018), there is limited empirical evidence examining how these policies are enacted at the classroom level. Existing studies are often descriptive or case-based, lacking large-scale quantitative analysis that can inform decision-making.

Table 3
Research Gaps and Implications

Research Gap	Description of Gap	Evidence from Literature	Implication for This Study
Conceptual Gap (AI Integration)	AI integration measured as access or usage rather than pedagogical enactment	OECD (2021); Wang et al. (2024)	Reframe AI integration as teacher practice
Theoretical Gap (Fragmentation)	Lack of integrated models linking AI, leadership, and pedagogy	Tan et al. (2024); Kabudi et al. (2021)	Develop integrated conceptual framework
Leadership Gap	Teacher leadership not included in AI adoption models	Lovett (2023); Ghamrawi (2023)	Include teacher leadership as mediator
Pedagogical Gap (SCL)	Weak measurement of student-centred learning outcomes	UNESCO (2023); Kabudi et al. (2021)	Use validated SCL constructs
Trust & Ethics Gap	Trust and governance rarely operationalised in models	Nazaretsky et al. (2022); UNESCO (2023)	Include trust as contextual factor
Methodological Gap	Over-reliance on cross-sectional, direct-effect studies	Tan et al. (2024)	Use SEM and mediation analysis
Contextual Gap (UAE)	Limited empirical research in UAE school context	UAE Government (2018); Almarzooqi et al. (2024)	Provide UAE-based quantitative evidence
Practice Gap	Focus on tools rather than teacher capability and PD	Tan et al. (2024)	Emphasise teacher capability and leadership
Measurement Gap	Use of generic TAM/UTAUT scales not adapted to AI teaching	Scherer et al. (2019)	Adapt constructs to AI context
Impact Gap	Limited evidence linking AI to real classroom outcomes	Wang et al. (2024); Joshi et al. (2020)	Test relationship with SCL outcomes

Significance of the study

This paper provides a significant contribution by addressing several critical issues identified in the existing literature on Artificial Intelligence (AI) in education. First, it responds to the tendency for AI integration to be conceptualised as mere access or frequency of use rather than meaningful pedagogical enactment, where technology is often implemented superficially without improving instructional practice (OECD, 2021; Wang et al., 2024). Second, it tackles the fragmentation in research that separates AI adoption from teacher leadership, despite evidence that leadership plays a vital role in facilitating innovation and instructional improvement within schools (Lovett, 2023; Ghamrawi, 2023). Third, the paper addresses the weak empirical linkage between AI use and student-centred learning, where many studies assume that personalisation automatically leads to student-centred pedagogy without measuring actual learner autonomy, engagement, or interaction (UNESCO, 2023; Kabudi et al., 2021). By synthesising these issues, the paper proposes an integrated framework that positions teacher leadership as a mediating mechanism connecting AI integration with pedagogical outcomes. This shifts the focus from technological tools to teacher practice, professional capability, and organisational context, thereby providing a stronger theoretical and practical foundation for future research, policy, and professional development.

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