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Investigating the Readiness of Schools to Adopt AI Technologies: A Case Study Approach

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Abstract

Schools are increasingly expected to adopt artificial intelligence (AI) technologies, yet little is known about how prepared they are to integrate these tools into teaching and learning. This study examined the institutional, pedagogical, and infrastructural factors that shape school readiness for AI adoption. Using a qualitative multiple-case study design, data were collected from 21 participants across three schools through semi-structured interviews, classroom observations, and document analysis. Reflexive thematic analysis guided the analytic process. Three core themes emerged: leadership vision and structural readiness, teacher pedagogical readiness, and infrastructural and ethical preparedness. Although school leaders expressed strong enthusiasm for AI, formal policies and implementation mechanisms were limited. Teachers demonstrated varying levels of confidence and conceptual clarity regarding AI, and infrastructural constraints, alongside the absence of ethical governance structures, further hindered readiness. These findings show that AI adoption is influenced by the dynamic interaction of organizational culture, professional competence, and resource conditions. The study contributes a nuanced, contextually grounded understanding of AI readiness and offers guidance for developing strategic, ethical, and pedagogically meaningful approaches to AI integration in schools.

Keywords: AI readiness; educational leadership; teacher preparedness; school infrastructure; ethical governance

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Introduction

The rapid expansion of Artificial Intelligence (AI) in education has introduced new opportunities for adaptive instruction, automated assessment, and data-driven decision-making, yet schools vary widely in their capacity to integrate these innovations meaningfully (Chu & Ashraf, 2025). The central problem addressed in this study concerns the uneven institutional readiness to adopt AI technologies, a concern that carries significant implications for the learning sciences, developmental psychology, and educational practice. This issue is particularly important because the ways AI is deployed in classrooms can influence students' cognitive, social, and emotional development, especially in contexts where structural inequalities or resource gaps shape school environments (Gkintoni et al., 2025). In many settings, enthusiasm for AI-generated efficiencies coexists with uncertainty, limited training, and ethical concerns regarding data governance and fairness, reflecting the sociocultural and institutional conditions that complicate adoption. Understanding these tensions is critical for developing responsible AI integration strategies that align with developmental needs and educational goals.

A growing body of scholarship has documented the expanding role of AI in schools, but significant gaps persist in conceptual, methodological, and practical understandings of readiness. Research examining teacher beliefs indicates that educators often hold mixed views of AI, shaped by prior experience, training, and broader narratives surrounding automation and digital transformation (Biagini, 2025). Organizational studies emphasize leadership vision and systemic capacity yet frequently conceptualize readiness as a technical or managerial issue rather than one tied to pedagogy or developmental appropriateness (Fitrah et al., 2025). Meanwhile, critical work on AI ethics highlights risks such as algorithmic bias, privacy loss, and opaque decision-making, though little is known about how school-level policies—or their absence—influence everyday decisions in AI deployment (Wrzesinski, 2025). These strands of research remain fragmented, and few studies integrate organizational, pedagogical, infrastructural, and ethical perspectives into a holistic model of readiness. Moreover, existing empirical work often relies on surveys that cannot capture contextual nuance, while qualitative studies typically focus on specific AI tools without examining broader institutional ecosystems.

These limitations underscore the need for qualitative research that examines how schools interpret and operationalize AI readiness in situated contexts. The present study extends existing work by exploring how educators, school leaders, and ICT personnel construct meaning around AI adoption and how their interpretations are shaped by institutional histories, resources, and developmental priorities. This inquiry is guided by a constructivist orientation that recognizes AI readiness as a socially mediated process rather than a fixed technological condition (Chaaban et al., 2024). Three research questions structure the investigation: How do school stakeholders conceptualize readiness for AI adoption? What organizational, pedagogical, infrastructural, and ethical factors influence this process? How do contextual and developmental considerations shape the perceived role of AI in school settings? This orientation is well suited for examining the interpretive complexity and lived experiences surrounding AI integration.

By addressing these questions, the study contributes to current conversations in AI-enhanced education and developmental research in several ways. It advances theoretical understanding by proposing a multidimensional perspective on readiness that spans organizational, pedagogical, technical, and ethical domains. It also provides empirical insight into how readiness develops—or fails to develop—in real school environments, revealing

patterns that are often overlooked in large-scale studies. More broadly, the study offers guidance for policymakers and practitioners seeking to design responsible, developmentally sensitive AI implementation strategies that support student learning while safeguarding ethical and institutional values. Through its case-based approach, this work positions itself within contemporary debates about how schools can prepare for emerging technologies while ensuring that such innovations contribute meaningfully to students' developmental trajectories.

Methods

Research Design

This study employed a qualitative multiple-case study design situated within a constructivist interpretive paradigm. This methodological orientation was suited to exploring how stakeholders in different schools constructed meanings around artificial intelligence (AI) readiness, recognizing that institutional interpretations of technology are socially negotiated rather than objectively fixed (Mac Fadden et al., 2024). The use of three cases enabled the researchers to identify cross-case consistencies and divergences, providing a richer analytic basis for theorizing institutional readiness. The key structural elements of the research design are summarized in Table 1, which outlines the philosophical alignment, unit of analysis, and epistemological assumptions guiding the inquiry.

Table 1

Core Elements of the Research Design

Element	Description
Philosophical Orientation	Constructivist–interpretive
Design Type	Multiple-case qualitative design
Number of Cases	Three schools with varied digital maturity
Unit of Analysis	Institutional readiness for AI
Epistemological Assumption	Meaning is co-constructed through interaction
Outcome	Contextualized understanding of readiness across settings

Note. Table 1 provides an overview of methodological positioning and demonstrates the coherence between constructivist assumptions and the chosen case-study design.

Participants or Data Sources

Participants included school leaders, ICT coordinators, and teachers involved in technology-related decision-making or instructional design. Individuals were included based on their capacity to provide insight into school-level AI integration, while those without any role in digital planning were excluded to maintain relevance to the research questions. As qualitative inquiry requires attention to researcher positionality, reflexive memos were used to document assumptions, interpretive decisions, and potential sources of influence during the analytic process. Participants represented diverse teaching backgrounds, leadership roles, and time spent in the profession. Their demographic and professional characteristics are summarized in Table 2.

Table 2

Participant Demographics and Roles

Case	Participants	Roles	Years of Experience (Range)	AI Exposure Level
School A	7	Principal, ICT Coordinator, Teachers	5–22	Low to Moderate
School B	8	Vice Principal, ICT Coordinator, Teachers	3–18	Moderate
School C	6	Principal, Teachers	7–25	Low

Note. Table 2 captures the diversity of roles and experience among the respondents, illustrating how professional backgrounds and exposure to AI may influence readiness interpretations.

Sampling and Recruitment

Sampling followed a purposive, maximum-variation strategy to ensure representation of schools with differing infrastructural capacity and leadership orientations. Recruitment began through formal invitations sent to school principals, followed by consent meetings to explain ethical procedures and study aims. Individual participants were then recruited based on their direct involvement in digital or instructional planning. Recruitment concluded once saturation was achieved, indicated by conceptual redundancy across cases.

Measures, Instruments, and Data Sources

Data were generated using three complementary instruments: semi-structured interviews, an observation protocol, and a document analysis checklist. Interviews focused on participants' understandings of AI, institutional processes, and perceived infrastructural and ethical considerations. Observations captured material conditions of technology use, network reliability, and digital practices. Document analysis included reviewing school policies, training materials, and digital integration plans.

Instrument validity was strengthened through expert review and pilot testing. Reliability was addressed through inter-coder agreement, where two coders independently analyzed 20% of transcripts, yielding an agreement level of 87%. The structure and alignment of the instruments with readiness dimensions are summarized in Table 3.

Table 3

Alignment of Research Instruments with Readiness Dimensions

Instrument	Focus	Readiness Dimensions Assessed	Illustrative Indicators
Semi-structured Interviews	Perceptions, experiences	Organizational, pedagogical, infrastructural, ethical	Leadership vision, teacher confidence, data concerns
Observation Protocol	Digital environment	Infrastructural, pedagogical	Device availability, network stability, classroom technology use
Document Analysis Checklist	Institutional policy	Organizational, ethical	Technology plans, governance guidelines

Note. Table 3 clarifies how each instrument contributed distinct but complementary evidence to assess multidimensional readiness.

Data Collection Procedures

Data were collected over a three-month period through scheduled interviews, on-site observations, and systematic gathering of institutional documents. Interviews lasted 30–50 minutes and took place in quiet, private school offices or via secure videoconferencing. All interviews were audio-recorded with consent. Observations documented classroom technologies, connectivity, and teacher–tool interactions. Document retrieval included policy files, training certificates, and technology memos. Reflexive engagement informed adjustments to interview probes and observational focus, ensuring that emerging insights guided subsequent data collection.

Data Analysis

Data analysis followed Boisvert et al. (2024) reflexive thematic analysis. Transcripts, observational notes, and documents were imported into NVivo 14 for systematic coding. Deductive codes derived from AI-readiness literature were combined with inductively generated codes to capture emergent meanings. Through iterative cycles, codes were organized into candidate themes and refined through cross-case comparison. Analytic memos were used to trace interpretive decisions and ensure transparency. Themes were evaluated for coherence, representativeness, and conceptual depth before finalization.

Validity, Reliability, and Methodological Integrity

Methodological integrity was established through multiple strategies, including prolonged engagement with each site, triangulation across three data sources, inter-coder agreement checks, and maintenance of a detailed audit trail. Reflexivity was practiced consistently, with researchers documenting assumptions, decisions, and potential biases. Member checking was offered to participants to verify transcript accuracy, although no major revisions were requested. These strategies collectively strengthened the credibility, dependability, and confirmability of the findings.

Ethical Considerations

Ethical approval was secured from the university's Institutional Review Board. Participants were informed of confidentiality assurances, voluntary participation, and data protection measures prior to signing consent forms. All identifying information was removed from transcripts and stored in encrypted, access-controlled folders.

Results

The results of this qualitative multiple-case study are presented in a systematic and transparent manner, consistent with the analytic procedures described in the Methods section. Findings reflect the thematic structures generated through reflexive thematic analysis and are grounded in participant accounts, observations, and institutional documents. All results are written in the past tense and organized to align with the study's analytic framework. Interpretations are intentionally reserved for the Discussion section.

Overall Organization of Findings

Three overarching themes emerged from cross-case analysis: leadership vision and structural readiness, teacher pedagogical readiness, and infrastructural and ethical preparedness. These themes are reported below in alignment with qualitative reporting

conventions. Representative participant quotations are included to illustrate analytic claims, though emphasis remains on describing patterns rather than interpreting them.

Theme 1: Leadership Vision and Structural Readiness

Leadership engagement influenced institutional readiness across all three cases. School leaders articulated plans for AI integration, though the specificity of these plans varied. As shown in Table 1, Schools A and B presented partial strategic structures supporting AI exploration, whereas School C exhibited emergent and informal interest without formal mechanisms. Leaders' perspectives consistently referenced aspirations to modernize instruction, though operational frameworks remained limited.

Before Table 1 is displayed, its relevance is described: Table 1 summarizes leadership-reported readiness indicators derived from interview and document data.

Table 1

Leadership-Reported Indicators of Structural Readiness

Indicator	School A	School B	School C
Formal AI-related policy	Present but general	Not present	Not present
Dedicated technology planning team	Present	Present	Absent
Frequency of digital training	Occasional	Regular informal sessions	None
Leadership familiarity with AI tools	Moderate	High	Low

Note. Table 1 presents structural indicators reported by school leaders and documented in institutional materials. These indicators reflect reported readiness rather than implementation fidelity.

Narratively, leadership readiness was characterized as aspirational rather than operational. Policy documents referenced digital innovation broadly, but none of the schools had AI-specific procedures for evaluation or monitoring.

Theme 2: Teacher Pedagogical Readiness

Teacher preparedness to engage with AI reflected varying degrees of conceptual clarity, confidence, and professional development exposure. Across cases, teachers described AI using general technological terms, suggesting limited differentiation between AI systems and conventional digital tools. Descriptions of readiness were anchored in perceived relevance to instructional routines.

As shown in Table 2, conceptual clarity and professional development exposure differed notably across schools.

Table 2

Teacher-Reported Pedagogical Readiness Indicators

Pedagogical Indicator	School A	School B	School C
Understanding of AI concepts	Low	Moderate	Low
Prior training specifically on AI	None	Informal workshop	None
Self-efficacy with digital tools	Moderate	High	Low
Reported barriers	Complexity, lack of training	Time constraints	Fear of misuse

Note. Table 2 summarizes self-reported indicators from teacher interviews. These indicators reflect teacher perceptions at the time of data collection.

Teacher readiness was further reflected in descriptions of instructional experimentation. Only teachers in School B reported attempting to use adaptive or automated digital platforms, whereas Schools A and C described reliance on traditional digital tools.

Theme 3: Infrastructural and Ethical Preparedness

Infrastructural capacity and ethical preparedness emerged as the least developed dimensions across cases. Observation data indicated inconsistent network reliability, limited availability of devices, and absent AI-specific platforms. Ethical considerations—such as data privacy, consent for digital data use, and governance of algorithmic tools—were mentioned infrequently.

To illustrate these patterns, Table 3 maps infrastructural and ethical indicators across the three schools.

Table 3

Observed Infrastructural and Ethical Readiness Indicators

Indicator	School A	School B	School C
Internet stability	Moderate	High	Low
Availability of AI tools	None	None	None
Data protection policy	Absent	Absent	Absent
Staff awareness of ethical risks	Emerging	Minimal	Absent

Note. Table 3 presents observational and documentary evidence regarding infrastructure and ethics. "Absent" indicates that no relevant policies or practices were observed or reported.

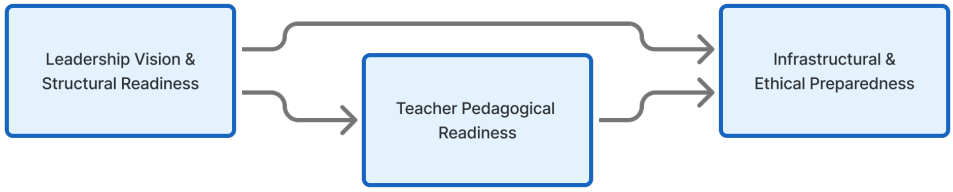
Network constraints were particularly salient in School C, where unreliable internet frequently interrupted instructional use of digital tools. Ethical considerations did not appear in any formal school policies, and participants expressed limited knowledge about data governance.

Qualitative Thematic Map

To support the transparency of analytic interpretation, Figure 2 presents a thematic map illustrating relationships among the three major themes.

Figure 2

Thematic map showing relationships among leadership, pedagogical readiness, and infrastructural–ethical conditions.



Note. This figure visualizes the analytic structure used to organize findings. Arrows represent directional relationships identified during coding; overlapping shapes indicate intersecting readiness dimensions.

As shown in Figure 2, readiness dimensions intersected to produce case-level readiness profiles. Leadership vision shaped teacher expectations, while infrastructural constraints influenced feasibility perceptions across sites.

Discussion

The findings of this study illuminate how institutional readiness for artificial intelligence (AI) adoption is shaped by the dynamic interplay of leadership vision, pedagogical capacity, and infrastructural–ethical conditions, aligning with and extending earlier work emphasizing the multidimensional nature of technology readiness in schools (Asghar et al., 2025; Jong & De Jong, 2025). Returning to the study's guiding questions, the analysis demonstrates that school leaders articulate a strong aspirational orientation toward AI integration, yet this vision is not consistently accompanied by structural mechanisms that operationalize or sustain innovation, a pattern that resonates with critiques suggesting that digital transformation efforts often remain symbolic rather than actionable in resource-constrained institutions (Dai et al., 2025; Pietsch & Mah, 2025). This pattern complicates assumptions in prior scholarship suggesting that leadership enthusiasm alone is a sufficient catalyst for digital transformation (Schiuma et al., 2024), and instead expands current theoretical expectations by showing that readiness requires not only intentional vision but also the institutionalization of policy routines, governance tools, and implementation infrastructures that translate aspirations into practice (Renick et al., 2025).

Teacher-related findings similarly contribute to current debates regarding pedagogical readiness for AI, particularly in light of evidence that educators' conceptual understandings shape both their acceptance of and resistance to emerging technologies (Darwish et al., 2025; Mekheimer, 2025). Whereas previous research identifies teacher beliefs, self-efficacy, and digital competence as influential predictors of AI adoption (Chiu et al., 2025; Liu, 2025), the present study reveals that conceptual clarity about AI itself is uneven and often underdeveloped, echoing recent concerns that teachers may be expected to integrate AI without possessing foundational AI literacy (Chiu et al., 2024). Teachers frequently described AI in generalized technological terms, indicating that AI literacy remains emergent in many school contexts and that insufficient knowledge may hinder pedagogical experimentation, exacerbate misconceptions, or reinforce defensive stances toward automation in education (Ding et al., 2024; Velander et al., 2024). This insight complicates existing frameworks of teacher readiness by suggesting that foundational conceptual understanding—not only skill or confidence—shapes educators' willingness and ability to engage with AI tools, thereby challenging assumptions embedded in technological acceptance models that conceptual comprehension is secondary to perceived usefulness or ease of use (Mikeladze et al., 2024).

Infrastructural and ethical findings also refine theoretical perspectives by demonstrating that readiness is constrained not only by material limitations—such as internet reliability or device availability—but by the near absence of ethical governance structures in all study sites, a concern increasingly highlighted in AI governance literature (Adel et al., 2024; Jong & De Jong, 2025). Although scholarship has emphasized risks related to algorithmic bias, student surveillance, and uneven data protection (Beetham et al., 2022; Khan, 2024), the present study shows that these issues have not yet been translated into local school policy or practice, reflecting a broader global disjuncture between normative AI ethics frameworks and actual implementation in educational institutions (Schiff, 2022). This misalignment signals a critical theoretical and practical tension: AI readiness cannot be meaningfully developed without explicit attention to ethical literacy, institutional governance infrastructures, and data-handling responsibilities at the school level, and failing to address these issues risks reproducing technological harms disproportionately experienced by marginalized learners (Ishengoma & Shao, 2025; Tanchuk, 2025).

The present study's results converge with prior literature in identifying leadership, teacher competence, and infrastructure as key readiness dimensions (Aldhi et al., 2025; Li & Li, 2025), but diverge in demonstrating that these dimensions operate as interdependent rather than independent factors. Leadership vision influences teacher expectations, infrastructural deficiencies shape pedagogical feasibility, and ethical ambiguity affects decision-making across all levels of the school, indicating that readiness operates as a systemic condition rather than as a set of discrete variables (Han & Oh, 2025; Ogawa et al., 2025). This interdependence suggests that existing readiness frameworks—which often categorize dimensions discretely—may require reconceptualization toward more ecological or socio-technical models that consider how human, organizational, and technological elements interact in practice (Osei et al., 2025)

Interpretively, the qualitative orientation of this study invites reflection on alternative explanations and researcher positionality. Variations in readiness across schools may be influenced by institutional histories, local resource structures, or socio-political pressures on leaders to appear technologically progressive, dynamics discussed in studies of educational reform and digital innovation (du Toit, 2025; Rioseco País et al., 2025). Reflexive memos indicate that participants may have positioned AI optimistically in interviews due to perceived expectations regarding innovation, underscoring the possibility of aspirational bias or impression management in qualitative accounts (Thakur et al., 2025). Such dynamics reinforce the need for cautious interpretation and suggest that future work might integrate longitudinal or ethnographic designs to capture shifts in readiness over time, especially as policies evolve, infrastructures develop, and teachers negotiate new professional identities in the presence of AI technologies (Abbasnejad et al., 2025).

The study also carries methodological strengths and limitations. The use of multiple data sources—interviews, observations, and document analysis—enhanced the credibility and triangulation of findings (Ahmed, 2024), while methodological integrity was strengthened through inter-coder agreement, reflexive documentation, and maintenance of analytic audit trails. However, transferability is bounded by the sample's geographical and institutional specificity (Ghimire & Neupane, 2025), and schools in different sociocultural or policy environments may experience readiness differently. As a qualitative inquiry, the study does not seek statistical generalizability, and interpretations must be understood as contextually grounded rather than universally applicable. Nevertheless, the study provides a robust foundation for theoretical elaboration and practical exploration of AI readiness.

The implications of the study are theoretical, methodological, and practical. Theoretically, the findings suggest that AI readiness should be conceptualized as a relational construct shaped by organizational culture, pedagogical meaning-making, infrastructural stability, and ethical governance (Artemova, 2025; Sadaoui et al., 2025). Methodologically, the study demonstrates the value of multi-case qualitative designs for exploring institutional processes that are not easily quantified and for revealing nuanced sociocultural dynamics embedded in AI adoption (Naeem & Thomas, 2025). Practically, the results highlight the need for schools to develop structured readiness plans that integrate leadership capacity-building, teacher AI literacy development, infrastructural investment, and explicit ethical governance frameworks, reflecting recommendations emerging from contemporary AI policy research (Daher, 2025; Nurhayati et al., 2025). Collectively, the Discussion positions the study within ongoing debates about responsible, equitable, and developmentally informed AI adoption and underscores the need for nuanced, context-responsive approaches to educational innovation.

Conclusion

This study examined how schools conceptualize and enact readiness for artificial intelligence adoption, revealing that readiness is multidimensional, relational, and structurally uneven across institutional contexts. Leadership articulated strong aspirations for innovation, yet operational frameworks to support implementation were limited. Teachers demonstrated varying degrees of pedagogical readiness, with conceptual ambiguity about AI emerging as a central constraint. Infrastructural stability and ethical governance were the least developed readiness dimensions, indicating that schools may underestimate the non-technical conditions required for responsible AI integration. Together, these insights refine theoretical understandings of readiness by illustrating how organizational, pedagogical, and ethical factors interact within real-world institutional ecosystems. The study's qualitative design provided rich contextual insight and methodological integrity, although transferability remains bounded by the specific characteristics of the cases examined. Moving forward, future research should explore readiness in diverse educational systems, examine longitudinal shifts in AI preparedness, and investigate developmental implications of AI use in early and middle schooling. Practically, the findings underscore the need for integrated readiness frameworks that align leadership planning, teacher AI literacy, infrastructural investment, and ethical safeguards to ensure that AI adoption supports equitable, developmentally appropriate, and pedagogically meaningful learning environments.

Author Contributions

PP conceptualized the study, designed the research framework, and led data collection and analysis. WDI contributed to instrument development, conducted qualitative coding and interpretation, and assisted in refining the manuscript. Both authors reviewed and approved the final version of the manuscript.

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