School leaders and AI-driven education: a comparative study of readiness, perceptions and implementation strategies

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Abstract

Purpose – The rapid integration of artificial intelligence (AI) in education necessitates that school leaders and educators develop the knowledge and readiness to implement AI-driven innovations both effectively and ethically. Guided by the technology acceptance model and distributed leadership theory, this study examines disparities in AI familiarity, perceived relevance of AI-related skills, and institutional readiness between K-12 school leaders and teachers.

Design/methodology/approach – Using survey data from 147 US based K-12 educators, the findings reveal that school leaders report higher levels of AI familiarity and optimism, while teachers express more varied perspectives and lower confidence in implementation. Qualitative responses further highlight concerns about relevance, training gaps and ethical implications such as data privacy and algorithmic bias.

Findings – These insights emphasize the need for targeted, job embedded professional development, collaborative leadership models and policy frameworks that are inclusive, equity focused and responsive to instructional realities.

Originality/value – The study contributes to global conversations on school leadership by framing AI adoption not just as a technical issue, but as a sociotechnical and policy challenge requiring intentional, cross-sector collaboration.

Keywords Artificial intelligence (AI), Distributed leadership, Technology acceptance model, School leadership, Teacher, Perceptions, Readiness, Mixed methods

Paper type Research article

Introduction

The integration of Artificial Intelligence (AI) in K-12 education has emerged as a transformative force, reshaping traditional pedagogical approaches and enabling personalized learning while raising concerns about ethics, equity, and access particularly in under-resourced and marginalized communities (Fullan *et al*., 2023; Kalnina *et al*., 2024; Kavitha and Joshith, 2024; Kim and Wargo, 2025; Lake, 2024). AI offers opportunities to enhance student engagement, streamline administrative work, and generate data-driven insights (Bickerstaff *et al*., 2024; Diliberti *et al*., 2024; Reynolds and Dhawan, 2022), but its adoption is tempered by worries about bias, surveillance, and the reinforcement of inequities (Cabrera *et al*., 2024; Massala, 2023). Research demonstrates that AI can support adaptive learning by tailoring instruction to individual needs (Zhang *et al*., 2024), yet adoption remains uneven, especially between leaders and teachers (Braaten and Farnsworth, 2024; Magnusson and Israelsson, 2024). Globally, while some nations integrate AI into curricula, others face connectivity gaps and infrastructure shortages, widening the digital divide. These disparities underscore the need to view AI readiness not only as a technical matter but also a policy and justice-oriented concern (Karakose and Tülübaş, 2024; Zafari *et al*., 2022).

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AI in K-12 education is more than a technical upgrade. It signals a shift in preparing students for an AI-driven future. While about 60% of U.S. educators report classroom use of AI (Reynolds and Dhawan, 2022), confidence and familiarity differ sharply: leaders show greater comfort than teachers (Braaten and Farnsworth, 2024; Magnusson and Israelsson, 2024). These disparities highlight the need for comparative research that examines how institutional hierarchies and decision-making power shape AI adoption (Goldman, 2023; Liu and Watson, 2023).

Educational leaders and teachers both play pivotal roles in technology integration. Leaders set vision, policies, and funding priorities, aligning AI with broader goals (Mosley, 2012; Fullan *et al*., 2023; Karakose and Tülübaş, 2024), while teachers act as primary facilitators of AI-enhanced learning, embedding tools into classroom practice (Zhang *et al*., 2024). However, many educators lack sufficient training and resources to use AI effectively (Frontline Research and Learning Institute, 2024; EdTech Digit, 2024).

Although AI's importance is increasingly recognized, research comparing leaders' and teachers' perspectives remains limited. Most studies examine general attitudes toward AI, but few focus on disparities in perceptions, preparedness, and institutional readiness. Addressing this gap is critical because both groups are essential to effective implementation. Comparative insights are valuable for three reasons: (1) they inform targeted professional development tailored to leaders and teachers (Diliberti *et al*., 2024; Fullan *et al*., 2023); (2) they help align institutional goals with classroom realities (Bickerstaff *et al*., 2024; Karakose and Tülübaş, 2024); and (3) they highlight opportunities and challenges for equitable AI integration in K–12 education (Goldman, 2023).

Literature

AI adoption trends in K-12 education

Artificial Intelligence (AI) is transforming K-12 education by enabling personalized learning, automating assessments, and enhancing administrative efficiency. AI-powered tools, such as adaptive learning platforms, chatbots, and intelligent tutoring systems, are increasingly integrated into classrooms to improve student engagement and learning outcomes (Semwaiko *et al*., 2024; Wang and Cheng, 2021). The market for AI in education continues to expand, with projections estimating its value to reach $32.27 billion by 2030, driven by investments in machine learning algorithms and AI-based educational applications (Grand View Research, 2024).

Despite the rapid growth of AI in education, its adoption remains inconsistent across schools and districts, exacerbated by systemic inequities in digital infrastructure, local policy directives, and varying degrees of national investment in AI readiness (Kalnina *et al*., 2024; Zafari *et al*., 2022). Research indicates that while approximately 60% of educators have incorporated AI in some form, familiarity and confidence levels vary significantly between school leaders and teachers (Reynolds and Dhawan, 2022). School leaders tend to exhibit greater optimism and preparedness regarding AI integration, whereas teachers express more diverse perspectives, shaped by concerns about accessibility, ethical implications, and pedagogical alignment (Braaten and Farnsworth, 2024; Magnusson and Israelsson, 2024). Some AI-powered tools, such as ChatGPT and AI-enhanced grading systems, have been met with enthusiasm, yet many teachers hesitate to integrate AI due to the lack of structured professional development and clear institutional policies (Frontline Research and Learning Institute, 2024).

The disparities in AI adoption between leaders and teachers highlight the need for a more coherent and inclusive strategy for AI implementation in K-12 education. Teachers often require more targeted training and institutional support to navigate AI's potential challenges, which include not only technical and pedagogical issues but also deeper concerns around algorithmic discrimination, opaque decision-making systems, and the ethical implications of surveillance embedded in AI-powered tools (Lake, 2024; Zafari *et al*., 2022; Zhang *et al*., 2024). As AI continues to evolve, addressing these challenges will be essential to ensuring equitable access and effective integration across all levels of K-12 education. Scholars have called for more

sociotechnical critiques of AI adoption that move beyond efficiency and personalization to examine how power, policy, and ethics intersect in shaping who benefits and who is left behind in AI-driven educational systems (Fullan *et al*., 2023; Zawacki-Richter *et al*., 2024).

Challenges in AI adoption: leaders vs. teachers

The integration of AI in K–12 education depends on the joint efforts of school leaders and teachers, whose roles are distinct yet interconnected. Leaders set policies, allocate resources, and align AI initiatives with broader goals such as ethical stewardship, digital equity, and data governance (Fullan *et al*., 2023; Karakose and Tülübaş, 2024). Their decisions influence institutional readiness, often emphasizing efficiency, data-driven decision-making, and curriculum development (Kim, 2025; Ghimire and Edwards, 2024). Yet they face barriers including compliance with U.S. privacy laws like FERPA and COPPA, inequitable access in underfunded districts, and fragmented global regulations that reflect divergent funding priorities and political will (Kaufman *et al*., 2025; Zafari *et al*., 2022; Zawacki-Richter *et al*., 2024).

At the classroom level, teachers are expected to integrate AI tools but often lack training and confidence (Diliberti *et al*., 2024; Bickerstaff *et al*., 2024). A national survey found that most teachers lack substantial training and confidence (Frontline Research and Learning Institute, 2024). Many view AI mandates as top-down reforms lacking classroom relevance or cultural responsiveness, reinforcing skepticism (Bickerstaff *et al*., 2024; Magnusson and Israelsson, 2024). Limited preparation amplifies hesitancy, especially when AI-generated content raises issues of accuracy, ethics, and student engagement (Braaten and Farnsworth, 2024).

Ethical concerns complicate classroom AI use. Teachers worry about biased assessments, plagiarism, and student overreliance on AI tools. They also question whether AI reflects diverse cultural perspectives or reinforces Western-centric assumptions (Kalnina *et al*., 2024; Zhang *et al*., 2024). Without clear guidelines, many feel uncertain about responsible integration, and inconsistent district policies further deepen this uncertainty (Bickerstaff *et al*., 2024).

Despite these challenges, both school leaders and teachers recognize the transformative potential of AI in education. However, for AI to be effectively integrated, there is a pressing need for professional development programs, structured policy frameworks, and leadership models that bridge the gap between administrative AI advocacy and practical classroom implementation (Goldman, 2023; Karakose and Tülübaş, 2024). Ultimately, the challenges faced by both leaders and teachers are not simply technical hurdles but symptoms of deeper sociopolitical dynamics that shape how AI is introduced, regulated, and resisted in educational institutions across contexts (Zawacki-Richter *et al*., 2024; Liu and Watson, 2023).

Theoretical perspectives on AI integration

The integration of AI in K-12 education can be better understood through two key theoretical frameworks: the Technology Acceptance Model (TAM) and Distributed Leadership Theory, which together provide both an individual-level and organizational lens on the sociotechnical complexities of AI integration (Davis, 1989; Spillane, 2006; Liu *et al*., 2024). The Technology Acceptance Model (TAM) (Davis, 1989) suggests that an individual's decision to adopt technology is influenced by their perception of its usefulness and ease of use. In the context of AI integration, teachers and school leaders are more likely to embrace AI tools when they perceive these technologies as enhancing efficiency and improving student outcomes (Ghimire and Edwards, 2024). However, barriers such as lack of training, ethical concerns, and uncertainty about AI's long-term impact can reduce adoption rates. These barriers are not only cognitive or logistical but are often embedded in broader institutional structures and cultural narratives around risk, surveillance, and algorithmic control (Ghimire and Edwards, 2024; Kalnina *et al*., 2024). Studies have demonstrated that teachers who participate in AI-focused professional development programs report significantly higher levels of confidence and willingness to integrate AI into their instructional practices (Liu *et al*., 2024).

Distributed Leadership Theory (Spillane, 2006) emphasizes the importance of collaborative leadership in technological innovation. Unlike traditional hierarchical models, distributed leadership structures encourage shared decision-making among administrators, teachers, and technology specialists, fostering a more inclusive and adaptable approach to AI integration (Baker and Anderson, 2024; Karakose and Tülübaş, 2024). Schools that adopt a distributed leadership model are more effective in implementing AI initiatives, as they create opportunities for professional collaboration, mentorship, and cross-disciplinary engagement (Baker and Anderson, 2024; Liu and Watson, 2023). Research indicates that schools with strong collaborative leadership frameworks exhibit higher AI adoption rates and greater teacher confidence in using AI tools than those with top-down mandates (Zawacki-Richter *et al*., 2024). Moreover, leadership styles and school governance models vary significantly across international contexts, which influences how distributed leadership can either empower or marginalize educators during AI adoption processes (Zawacki-Richter *et al*., 2024; Ottestad, 2013).

By combining insights from TAM and Distributed Leadership Theory, it is possible to identify key factors that influence AI adoption at both the individual and organizational levels. While TAM highlights the importance of perceived usefulness and ease of use in shaping educators' attitudes toward AI, Distributed Leadership Theory underscores the role of institutional support and collaborative decision-making in ensuring successful implementation (Baker and Anderson, 2024). Together, these frameworks provide a comprehensive understanding of the challenges and opportunities associated with AI integration in K-12 education, illuminating not only the perceived utility of AI tools but also the distributed power dynamics and institutional readiness that shape how, where, and for whom AI is implemented (Spillane, 2006; Liu and Watson, 2023; Fullan *et al*., 2023).

Bridging the research gap: addressing institutional AI misalignment

Despite increasing research on AI in education, significant gaps remain in understanding the differing perspectives of school leaders and teachers regarding AI integration (Braaten and Farnsworth, 2024; Bickerstaff *et al*., 2024), especially when viewed through the lens of policy alignment, power asymmetries, and the socio-political context of AI readiness across schools and regions (Goldman, 2023; Liu and Watson, 2023; Kalnina *et al*., 2024). Many studies have focused on general AI adoption trends without addressing the specific challenges faced by educators in different roles. This misalignment between institutional AI policies and classroom realities has been identified as a key barrier to effective AI implementation (Magnusson and Israelsson, 2024), mirroring global trends where top-down innovation agendas often fail to reflect the capacities, constraints, or cultural contexts of frontline educators (Zafari *et al*., 2022; Zhang *et al*., 2024).

Addressing this gap is critical for several reasons. Research on AI preparedness can inform more targeted professional development initiatives, ensuring that training programs align with teachers' practical needs (Cheah *et al*., 2025; Fullan *et al*., 2023; Kim, 2025). Understanding discrepancies in AI perceptions between leaders and teachers can help create policies that balance administrative priorities with classroom realities, ultimately ensuring that AI integration is inclusive, context-responsive, and ethically grounded across diverse educational settings (Zawacki-Richter *et al*., 2024; Karakose and Tülübaş, 2024). By exploring the comparative perspectives of school leaders and teachers, this study aims to provide actionable insights that will support the development of evidence-based policies, role-specific training programs, and more equitable AI adoption practices in K-12 education.

Methodology

Survey design and participants

This study utilized a cross-sectional survey research design to examine K-12 school leaders' and teachers' familiarity, perceptions, and preparedness regarding AI integration in education.

The survey instrument assessed AI familiarity, perceived importance of AI-related skills for students, and institutional readiness for AI implementation. A mix of closed- and open-ended questions provided quantitative and qualitative insights, with Likert-scale items measuring AI familiarity and multiple-choice questions capturing broader perspectives. The qualitative portion was integrated as a follow-up to closed-ended survey items, allowing participants to elaborate on institutional barriers, ethical concerns, or readiness needs not captured by Likert-scale items. This open-ended design enriched the interpretation of the survey results and allowed for nuanced comparisons between leadership and instructional perspectives.

The survey underwent pre-testing by a panel of educational researchers and practitioners specializing in technology integration to ensure clarity and content validity. Minor refinements were made before its administration via Qualtrics. Participants were recruited through a purposive and snowball sampling approach to include a diverse representation of K-12 educators. A total of 147 respondents participated, comprising 44 school leaders (principals, superintendents, technology directors) and 103 teachers from urban, suburban, and rural schools across the western United States. The sample included educators from public, private, and charter schools, allowing for comparative analysis across different institutional settings.

Data collection

Survey invitations were distributed via professional education networks, social media, and direct emails to school districts and educational organizations. The snowball sampling strategy encouraged initial respondents to share the survey with colleagues to expand their participation. The survey remained open for six weeks, with two follow-up reminders sent at two-week intervals to maximize responses, particularly among underrepresented groups, such as rural educators and those with limited AI exposure.

Demographic and professional background data, including participants' roles, years of experience, and subject specializations, were collected alongside AI-related responses. Anonymized tracking enabled monitoring of response trends and informed outreach adjustments. Ethical considerations were maintained throughout, with voluntary participation, informed consent, and strict confidentiality measures. No personally identifiable information was collected, and all data were securely stored in a password-protected database.

Data analysis

A mixed-methods approach was employed to analyze AI readiness, perceptions, and barriers among leaders and teachers, informing policy and professional development recommendations. Quantitative data were analyzed using IBM SPSS Statistics 28, with a significance level of $\alpha = 0.05$. Descriptive statistics, including means and standard deviations, were calculated for AI familiarity, perceived necessity of AI skills, and institutional AI planning status. Independent-samples *t*-tests examined differences between leaders and teachers regarding AI familiarity, the perceived importance of AI skills, and institutional readiness. A chi-square test of independence assessed associations between respondents' roles and institutional AI planning stages. Effect sizes (Cohen's d) were calculated to measure the practical significance of differences, and data visualizations, such as bar charts and boxplots, illustrated key trends.

Open-ended responses were analyzed using an inductive thematic analysis approach to identify recurring themes related to AI integration needs and concerns. Initial open coding was conducted independently by two researchers to ensure consistency in identifying salient categories. Codes were then iteratively refined through constant comparison, leading to the development of four overarching themes. Thematic saturation was determined when no new codes emerged during analysis of the final 20% of responses. (Braun and Clarke, 2006; Creswell and Poth, 2018). The analysis distinguished between first-order barriers (e.g. lack of policies, funding, infrastructure) and second-order barriers (e.g. pedagogical concerns, ethical considerations), with frequencies reported as a percentage of total responses. These themes

provided insight into areas where school leaders and teachers differed in their expectations and support needs. To enhance trustworthiness, the research team employed peer debriefing and analyst triangulation. Any discrepancies in coding were resolved through collaborative discussion, and an audit trail was maintained to document analytic decisions. (Nowell *et al*., 2017)

The study was approved by the University of Idaho Institutional Review Board (IRB #026288) and adhered to ethical research guidelines. Informed consent was obtained, and participation was voluntary, with respondents free to withdraw at any time without penalty.

Results

(1) Participants' Background

The majority of participants (84.4%, $N = 124$ out of 147) identified as White/Caucasian, with 3.2% identifying as American Indian or Alaska Native, and 12.4% representing other ethnic backgrounds. Regarding gender distribution, 35.4% of respondents identified as male, while 60.6% identified as female. The sample predominantly consisted of individuals from rural areas (72.8%, $N = 107$), followed by participants from suburban (19.6%) and urban (7.6%) settings.

In terms of professional roles, most participants were full-time teachers, representing 70.0% ($N = 103$) of the sample, whereas 29.9% ($N = 44$) were categorized as educational leaders, including administrators and district decision-makers. The composition reflects strong engagement from classroom educators in discussions about AI integration, while also incorporating perspectives from leadership roles in K-12 education.

(2) Perception of AI Impact

The analysis shows that, when it comes to AI Impact Perception, leaders are notably more optimistic compared to teachers. For instance, over half of the leaders (52.3%) considered AI to be "Somewhat positive", while only 18.18% viewed AI as "Extremely positive" and a very small 2.3% perceived it as "Extremely negative". In contrast, teachers presented a more evenly spread range of opinions. Approximately 26.21% of teachers saw AI as "Somewhat positive", but a considerably higher percentage, 16.5%, saw it as "Extremely negative". Additionally, teachers' responses were more dispersed, with 18.45% responding "Neither positive nor negative" and 28.16% indicating "Somewhat negative" (see Table 1). This percentage breakdown highlights the significant perception gap between leaders and teachers, with leaders showing notably more optimistic views about AI's impact on education compared to teachers who show more varied and cautious perspectives.

(3) Perceived Barriers to AI Integration in K-12 Education

The study identified multiple barriers that hinder the integration of AI in K-12 education, which were categorized into first-order barriers (external factors, such as lack of resources and

Table 1. Perceived AI impact

AI impact rating	Leaders (*N*)	%	Teachers (*N*)	%
Extremely positive	8	18.2	11	10.7
Somewhat positive	23	52.3	27	26.2
Neutral	7	15.9	19	18.5
Somewhat negative	5	11.4	29	28.2
Extremely negative	1	2.3	17	16.5
Total	44	100	103	100

Source(s): Author's own work

institutional policies) and second-order barriers (internal factors, such as teachers' pedagogical beliefs and concerns about AI's ethical implications). The top three challenges with multiple choice in Table 2:

First-order barriers accounted for 42% of reported challenges, with the most cited issues including a lack of policies, goals, and strategies (13%), limited technology access and infrastructure (10%), and insufficient technical support and funding (11%). Many teachers reported uncertainty regarding district AI guidelines, leading to hesitancy in adoption. Educators in underfunded districts faced additional challenges, including inadequate internet access and limited AI-compatible devices. While professional development is frequently cited as a key factor in technology integration, only 2% of respondents identified insufficient AI training as a major concern, suggesting that many educators may not yet see AI training as an immediate priority.

Second-order barriers represented 58% of reported challenges, with concerns about AI risks and value beliefs cited most frequently (17%). Teachers expressed skepticism regarding AI's ability to mitigate bias, ensure data security, and enhance learning. Pedagogical concerns (14%) included resistance to AI due to fears of reduced human interaction, particularly in early childhood education. Ethical issues such as plagiarism, responsible AI use, and student over-reliance on AI-generated content were also major concerns (14%). The findings indicate that while institutional constraints limit AI adoption, teacher perceptions and concerns about AI's role in education play an even greater role. Addressing these challenges requires clear policies, structured AI training, and ethical guidelines to support responsible and effective AI integration in K-12 settings.

(4) Comparative analysis of AI familiarity

AI familiarity was assessed using self-reported survey responses, where participants rated their level of familiarity with AI tools and applications on a five-point Likert scale (1 = "Not at all

Table 2. Perceived barriers to AI integration

Barrier type	Sub-count	Total (*N*)	%
First-order Barriers (Institutional and Structural)		*151*	*42%*
Lack of policies, goals, and strategies	46		13%
Lack of technology access (infrastructure, resources)	34		10%
Lack of technical support	23		6%
Lack of funding	19		5%
Lack of leadership commitment and support	18		5%
Lack of professional development or training	7		2%
Time constraint to learn and apply GenAI	4		1%
Second-order Barriers (Beliefs, Ethics, and Pedagogy)		*211*	*58%*
Technology value beliefs (risk, privacy, and accuracy concerns)	63		17%
- AI's inability to manage risks (bias, data privacy, security)	53		
- AI does not enhance learning or benefits do not outweigh risks	7		
- AI causes students to over-reliance	3		
Pedagogical beliefs (human interaction, subject alignment)	51		14%
- AI reduces human interaction in teaching	36		
- AI does not align with early childhood learning	6		
- AI should only be used for tech-related subjects (e.g. coding)	5		
- AI misaligns with teachers' instructional goals	4		
Ethical concerns (cheating, plagiarism, responsible use)	50		14%
Teacher awareness and/or attitudes (hesitancy, skepticism)	29		8%
Lack of AI knowledge and skills	18		5%
Total		*363*	*100%*

Source(s): Author's own work

familiar" to 5 = "Very familiar"). The analysis examined differences between educational leaders and teachers using descriptive statistics, independent-samples *t*-tests, and an ANOVA test.

Leaders demonstrated significantly higher familiarity with AI, with an average score of 4.50 (SD = 0.76), compared to teachers, who reported an average of 3.32 (SD = 1.32). The statistical analysis confirmed a substantial difference between the two groups, $t = 5.621$, $p < 0.001$. The effect size (Cohen's $d = 1.03$) indicates a strong and meaningful gap in AI familiarity, suggesting that leaders have significantly more exposure or experience with AI than teachers. The confidence interval for the mean difference (0.73–1.56) further supports the significance of this distinction. Table 3 and Figure 1 provide a detailed comparison of familiarity scores between the two groups.

The *p*-value indicates a significant difference in AI familiarity between leaders and teachers. The study analyzed differences in AI familiarity, perceived necessity of AI-related skills, and institutional readiness for AI integration among K-12 teachers and school leaders. Independent sample *t*-tests were conducted to determine significant differences. Leaders reported significantly higher AI familiarity compared to teachers (Figure 1), indicating a knowledge gap that could affect AI adoption in classrooms.

(5) Perceived Necessity of AI skills

The study examined differences in perceptions between school leaders and teachers regarding the necessity of AI skills for students. Results indicate a significant gap, with leaders rating AI

Table 3. AI familiarity statistics by role

Role	N	Mean	SD	*t*	*p*	Effect size (Cohen's d)
Leader	44	4.50	0.76	5.621	0.000***	1.03 (Large Effect)
Teacher	103	3.32	1.32			

Note(s): ***p < 0.001
Source(s): Author's own wor

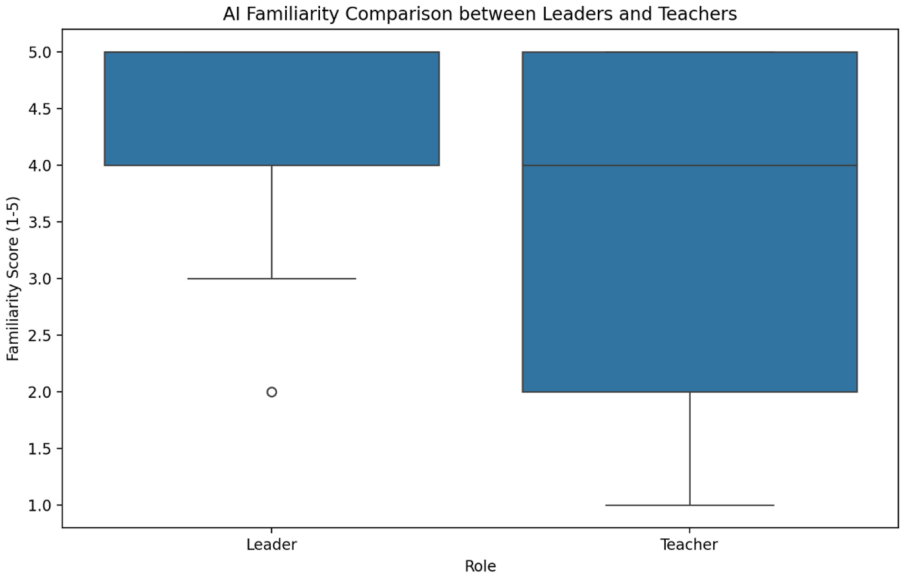

Figure 1. Boxplot visualization of AI Familiarity. Source: Author's own work

skills as more essential than teachers. In Table 4. Leaders reported a higher average necessity score (4.60, SD = 0.80) compared to teachers (3.70, SD = 1.25), a difference that was statistically significant ($t = 6.213$, $p < 0.001$), with a large effect size (Cohen's $d = 0.86$).

Among leaders, 72.7% viewed AI skills as "very necessary," whereas only 32.0% of teachers shared this view (Table 5). Teachers' responses were more varied, with 21.4% remaining neutral and 8.7% believing AI skills are unnecessary. These results suggest that while leaders recognize AI literacy as a critical competency for future workforce demands, many teachers are uncertain about its immediate relevance to classroom instruction.

The findings point to a potential disconnect between leaders and teaching staff. Leaders, given their broader institutional perspective and awareness of workforce trends, may view AI literacy as an essential future skill. In contrast, many teachers may struggle to see its immediate relevance in their instructional practices. This misalignment highlights the need for clearer communication, professional development, and practical strategies to support AI integration in classrooms.

(6) Institutional Planning for AI Integration

The study found notable discrepancies between school leaders and teachers regarding institutional readiness for AI integration. Leaders reported significantly higher perceptions of AI planning efforts ($M = 2.73$, SD = 0.95) compared to teachers ($M = 2.06$, SD = 0.88), with statistical analysis confirming this difference ($t = 3.748$, $p = 0.0002$, Cohen's $d = 0.74$), indicating a moderate effect size (Table 6).

Table 4. Perceived necessity of AI skills for students

Role	*N*	Mean	SD	*t*	*p*	Effect size (Cohen's d)
Leader	44	4.60	0.80	6.213	0.000***	1.86 (Large Effect)
Teacher	103	3.70	1.25			

Note(s): ***p < 0.001

Source(s): Author's own wor

Table 5. Distribution of responses on AI skill necessity

Necessity rating	Leaders (*N*)	%	Teachers (*N*)	%
Very necessary	32	72.7	33	32.0
Somewhat necessary	5	11.4	31	30.1
Neutral	6	13.6	22	21.4
Not very necessary	1	2.3	8	7.8
Not necessary at all	0	0	9	8.7
Total	44	100	103	100

Source(s): Author's own work

Table 6. Institutional AI planning readiness: leaders vs. teachers

Role	*N*	Mean	SD	*t*	*p*	Effect size (Cohen's d)
Leader	44	2.73	0.95	3.748	0.0002***	0.74 (Moderate Effect)
Teacher	103	2.06	0.88			

Note(s): ***p < 0.001

Source(s): Author's own wor

When asked about their institution's AI planning stage, 47.7% of leaders stated that AI was "on the radar" but without concrete action, compared to 50.5% of teachers who shared this view. However, a larger percentage of leaders (27.3%) reported that their schools were engaged in medium- or long-term AI planning, while only 5.8% of teachers held the same perception (Table 7). Conversely, 16.5% of teachers believed their schools had "no interest" in AI integration, compared to just 2.3% of leaders. Leaders were also more likely to indicate that their schools had completed or were piloting AI initiatives (11.4% vs. 3.9% for teachers).

These findings underscore the need for improved communication and collaborative decision-making between school leaders and teachers to ensure AI policies and implementation plans align with classroom realities. Providing clear institutional guidelines and structured professional development could bridge the gap between leadership planning and practical AI adoption in K-12 education.

(7) Thematic Insights

Qualitative analysis reveals distinct differences in how educational leaders and teachers perceive and approach AI integration in K-12 education. Leaders tend to engage with AI through a strategic and systemic lens, considering its long-term implications for institutional policies, resource allocation, and curriculum development (Table 8). Their perspective is shaped by a proactive stance, viewing AI not just as a tool but as an essential component of future-ready schools. Many leaders emphasize the necessity of creating structured AI literacy programs, securing funding for AI-powered infrastructure, and ensuring compliance with data privacy regulations. Their focus extends beyond immediate implementation, reflecting a broader vision of how AI can transform teaching, learning, and school operations.

Teachers, on the other hand, interact with AI at a more practical, classroom-centered level. Their concerns and experiences are grounded in the day-to-day realities of lesson planning, student assessment, and administrative tasks. While some teachers recognize the efficiency gains AI can offer, particularly in automating repetitive work, many remain uncertain about its role in direct instruction. Their perspectives vary significantly, with some expressing enthusiasm for AI's potential to enhance student engagement and personalized learning, while others remain hesitant due to a lack of training and unclear institutional policies.

While both groups acknowledged the value of AI integration, school leaders were significantly more likely to prioritize AI-related professional development initiatives compared to teachers. This divergence may reflect the broader strategic vision school leaders are tasked with, whereas teachers often face more immediate, classroom-based pressures that deprioritize long-term innovation. For many teachers, the lack of time, institutional support, and evidence of classroom relevance makes AI training seem abstract or nonessential (Magnusson and Israelsson, 2024; Bickerstaff *et al*., 2024). The uncertainty

Table 7. Institutional planning stage

Planning stage	Leaders (*N*)	%	Teachers (*N*)	%
Abandoned	0	0	3	2.9
Have already invested and deployed – successful	2	4.5	1	1.0
In medium- or long-term planning	12	27.3	6	5.8
In short-term planning	3	6.8	6	5.8
No interest	1	2.3	17	16.5
On the radar, no action planned	21	47.7	52	50.5
Pilot in progress or completed	5	11.4	4	3.9
Others	0	0	14	13.6
Total	44	100	103	100

Source(s): Author's own work

Table 8. Thematic analysis framework

Categories	Code	Description	Coding example
AI Readiness	AI_Familiarity	Leaders demonstrate higher familiarity and confidence in AI use compared to teachers	*"Our district has already started AI training for administrators to guide implementation."* (Leader 12)
	AI_Training_ Need	Both leaders and teachers express a need for targeted AI training at different levels	*"I want to use AI in my lessons, but I have no training or guidelines from my school."* (Teacher 32)
AI Use Cases	AI_Strategic_Use	Leaders view AI as a strategic tool for long-term institutional development	*"AI will shape how we plan curriculum, but we need policies to integrate it effectively."* (Leader 8)
	AI_Classroom_ Application	Teachers primarily use AI for lesson planning, assessment, and content generation	*"I use ChatGPT to generate quiz questions, but I don't let students use it directly."* (Teacher 45)
	AI_ Administrative_ Use	AI is being used to support administrative duties rather than direct classroom instruction	*"I use AI to write emails, draft reports, and create rubrics, but not for direct teaching." (Teacher 21)*
Ethical and Pedagogical Concerns	AI_Ethics	Concerns about AI bias, data privacy, and ethical considerations in student use	*"I'm worried students will use AI to cheat, and we don't have a clear policy on it." (Teacher 10)*
	AI_Human_ Interaction	Teachers worry that AI may replace or reduce human interactions in education	*"You can't replace human connection with AI. Students need real interactions to learn." (Teacher 58)*
Challenges	AI_Policy_Gap	Both groups identify a lack of clear AI guidelines at the institutional level	*"Right now, AI use is up to individual teachers, and that creates inconsistencies." (Leader 17)*
	AI_Resource_ Limitations	Teachers in under-resourced schools report difficulties accessing AI tools and infrastructure	*"Our school doesn't have the internet bandwidth or devices to use AI effectively." (Teacher 40)*
	AI_Resistance	Some educators remain skeptical about AI's role in education and resist adoption	*"AI feels like just another tech trend. I don't see the value in changing my teaching methods." (Teacher 29)*

Source(s): Author's own work

surrounding AI integration is further amplified by concerns over ethical issues, including student over-reliance on AI-generated content, data privacy risks, and academic integrity.

Despite these differences, both groups share common ground in their recognition of AI's inevitability in education. There is a mutual acknowledgment of the need for responsible implementation, ensuring that AI serves as a complement rather than a replacement for human instruction. Both leaders and teachers emphasize the importance of professional development tailored to their respective roles. Leaders advocate for structured training programs to support policy development and decision-making, while teachers seek hands-on guidance on integrating AI tools effectively into their instructional practices. The lack of clear institutional policies is a shared concern, as many educators feel uncertain about the ethical and pedagogical boundaries of AI use in classrooms.

Another key insight from the analysis is the discrepancy in AI readiness and confidence between leaders and teachers, which aligns with the quantitative findings. Leaders tend to be more confident in AI adoption, likely due to their access to professional development and participation in strategic planning discussions that position AI within a broader educational framework. In contrast, teachers exhibit more varied levels of readiness, with many feelings

underprepared or lacking the necessary resources to fully explore AI's potential. Specifically, teachers, while generally optimistic about AI's potential, reported lower levels of preparedness and confidence in using AI tools. Qualitative responses revealed recurring concerns about the mismatch between AI initiatives and existing school priorities, including overloaded curricula, standardized testing demands, and the absence of tailored training that aligns with specific subject areas. This suggests that AI readiness among teachers is not solely a matter of awareness but also of perceived relevance and institutional fit (Lake, 2024; Zhang *et al*., 2024).

Additionally, several teacher respondents expressed ethical discomfort with AI tools that automate grading or generate student feedback, citing a perceived loss of professional agency and diminished teacher student connection. These concerns further contribute to the reluctance toward AI training, even when its broader value is acknowledged. This gap underscores the need for targeted support systems that recognize these differing comfort levels and provide scaffolding for teachers still in the early stages of AI integration.

Ultimately, these findings underscore the necessity of a collaborative approach to AI integration, one that brings together the strategic perspectives of leaders with the practical insights of teachers. Schools must bridge the existing gaps through clear policy guidelines, role-specific training programs, and ongoing support structures. By fostering a culture of shared learning and open dialog, educational institutions can create an environment where AI is leveraged effectively, ethically, and equitably across all levels of the K-12 system.

Discussion

The integration of AI in K-12 education presents both opportunities and challenges, with a clear disparity in AI preparedness between educational leaders and teachers. This discussion expands on the implications of these gaps, provides recommendations for professional development, and emphasizes the necessity of collaboration between these roles to ensure successful AI adoption in education.

Implications of leadership-teacher gaps in AI preparedness

The results highlight a clear discrepancy in AI readiness and perceptions between K-12 school leaders and teachers, underscoring the need for education policy frameworks that recognize school leaders as AI capacity builders, not just compliance managers, capable of fostering innovation, equity, and ethical responsibility within their institutions (Fullan *et al*., 2023; Karakose and Tülübaş, 2024). Leaders demonstrate a higher level of confidence and strategic thinking regarding AI adoption, often viewing it as a critical tool for shaping future-ready schools. They focus on long-term planning, institutional policies, and resource allocation, recognizing AI's potential to transform curriculum delivery and operational efficiency. However, many leaders may overestimate the extent to which teachers feel prepared to integrate AI into their classrooms.

Conversely, teachers exhibit a more cautious and varied stance toward AI adoption. While some recognize its benefits, many remain uncertain about its practical applications, ethical considerations, and impact on student learning. The lack of hands-on training and clear guidelines exacerbates this uncertainty, leading to hesitancy in integrating AI tools into classroom instruction.

Additionally, concerns over data privacy, plagiarism, and student reliance on AI-generated content further contribute to teachers' reluctance. Policymakers and district leaders should allocate targeted funding to develop job-embedded, discipline specific AI training that connects instructional needs with pedagogical use cases. These supports should be designed collaboratively with teachers and include resources that are adaptable across grade levels and cultural contexts (Bickerstaff *et al*., 2024; Lake, 2024).

This gap in preparedness has profound implications for AI integration in K-12 education. If leaders continue to drive AI policies without addressing teachers' practical concerns, there is a

risk that AI adoption will be met with resistance or be implemented inconsistently across schools. Misalignment between leadership expectations and classroom realities may lead to ineffective AI policies that fail to support teachers in meaningful ways. To bridge this divide, schools must ensure that teachers receive the same level of exposure, training, and strategic support as their leaders, thereby fostering a more cohesive AI integration strategy.

Practical recommendations for professional development and training

Given the disparities in AI familiarity and confidence between leaders and teachers, targeted professional development programs are essential. AI training should be structured to address the unique needs of different roles in education, ensuring that both administrators and teachers are equipped with the necessary knowledge and skills to integrate AI effectively.

For school leaders, training should emphasize the development of policies and frameworks that ensure the ethical implementation of AI in educational settings. A critical component of this training involves understanding AI's role in strategic planning and institutional growth, equipping leaders with the knowledge to integrate AI effectively into long-term educational goals. Additionally, school leaders must be well-versed in compliance with data privacy laws and ethical AI practices to safeguard student information and uphold institutional integrity. Another key focus is securing funding and establishing partnerships to support AI-driven initiatives, ensuring that schools have the necessary resources to implement AI effectively. Beyond institutional planning, leaders must also play a supportive role in AI adoption by providing teachers with structured resources and clear guidelines, helping to bridge the gap between policy development and classroom application.

For teachers, training should be designed to be hands-on, accessible, and immediately relevant to their instructional practices. Practical AI workshops can introduce educators to AI tools that assist with lesson planning, student engagement, and assessment, allowing them to integrate AI seamlessly into their daily teaching routines. Understanding AI pedagogy is equally important, ensuring that AI is incorporated into teaching methods while maintaining a student-centered learning approach that fosters critical thinking and creativity.

Given the ethical challenges associated with AI, training should also focus on responsible AI use, including strategies to mitigate plagiarism risks, address algorithmic bias, and encourage ethical AI engagement among students. To foster ongoing professional growth, teachers should have opportunities to participate in collaborative learning networks such as Professional Learning Communities (PLCs), where they can share experiences, strategies, and challenges related to AI integration. Additionally, structured mentorship and coaching from educators who have successfully implemented AI in their teaching practices can provide valuable guidance and support, reinforcing a culture of continuous learning and adaptation to AI technologies.

Moreover, Training should be continuous and adaptable. A blended approach, combining self-paced modules, coaching, and collaborative learning, can meet educators' diverse needs while supporting sustained AI adoption. Schools can incorporate micro-learning modules where teachers can learn at their own pace and provide ongoing support through AI integration coaches to guide educators in implementing AI tools effectively.

Importance of collaboration and communication between roles

Bridging this readiness gap requires more collaborative efforts between school leaders, teachers, and policy stakeholders. State and local education agencies should convene AI implementation task forces, including educators, parents, technologists, and ethicists to co-design AI policies that prioritize transparency, student data protection, and instructional utility. These efforts should also incentivize public-private partnerships to ensure equitable access to AI infrastructure, especially in rural and underfunded districts (Kim and Wargo, 2025; Reynolds and Dhawan, 2022; Zawacki-Richter *et al*., 2024). Given the disparities in AI readiness, effective communication is crucial in ensuring that AI policies and strategies align with the realities of classroom instruction.

Policymakers can also learn from global approaches to AI integration in education. Countries like Singapore and Estonia have implemented national AI literacy strategies for both students and school leaders, supported by centralized teacher training systems and robust digital ethics guidelines. In contrast, the decentralized nature of U.S. education policy makes it critical to provide school level autonomy alongside state level support to maintain consistency in ethical standards and training opportunities (Karimov and Saarela, 2025; Zafari *et al*., 2022; Zhang *et al*., 2024).

A key challenge highlighted in the study is the disconnect in institutional planning. While leaders engage in AI policy discussions and long-term planning, many teachers remain uninformed about these initiatives. This lack of communication results in fragmented AI adoption, where some schools implement AI effectively while others lag behind. To address this, schools should establish cross-role collaboration teams that include administrators, instructional technology specialists, and teachers to ensure AI policies are practical, inclusive, and responsive to classroom needs.

Teachers should be active participants in AI-related decision-making, including policy development, training design, and tool selection. Structured opportunities such as teacher led pilot programs and AI task forces can ensure that strategies are contextually grounded. Furthermore, regular feedback loops should be established where teachers provide input on the effectiveness of AI tools and policies, allowing administrators to make data-driven adjustments. Schools can organize AI task forces consisting of educators across different disciplines to explore best practices for AI integration, ensuring that AI strategies are contextually relevant and adaptable to different teaching environments.

By fostering an environment where leaders and teachers work collaboratively, AI adoption in K-12 education can become more seamless and impactful. When teachers feel supported, included, and adequately trained, they are more likely to embrace AI as a valuable educational tool rather than a disruptive force.

Limitations

This study's findings are shaped by several limitations. Our sample comprised U.S.-based educators from diverse but non-randomized regions, limiting global generalizability. The snowball sampling and self-selection design may have reduced participant diversity, and self-reported data may introduce bias. Moreover, the absence of longitudinal or international comparisons constrains cross-cultural applicability. Because AI adoption in education varies widely across countries in terms of infrastructure, policies, and equity contexts, findings should be interpreted cautiously beyond the U.S. Future studies should include larger, more representative, and international samples to better capture global perspectives on AI readiness and implementation.

Conclusion

This study contributes to the growing literature on AI in K-12 education by examining the differing perceptions of school leaders and teachers, highlighting disparities in familiarity, readiness, and institutional support. Key barriers to implementation include unclear policies, ethical concerns, and limited teacher engagement with AI training. Leaders tend to view AI as a strategic opportunity, while teachers express skepticism about its classroom relevance. Addressing these gaps requires aligning policy with practice, supporting teacher-led innovation, and framing AI as a pedagogical, not just technical tool.

To ensure successful AI integration, schools must prioritize teacher-centered training, ethical guidelines, and collaborative decision-making between leadership and instructional staff. Future research should explore long-term impacts of AI strategies, policy effectiveness, and cross-national comparisons. With intentional leadership and inclusive planning, AI can become a transformative force in equitable, future ready education.

Original manuscript statement

This manuscript explores the disparities in AI familiarity and preparedness between K-12 educational leaders and teachers, providing insights into school leadership regarding institutional AI readiness and professional development needs.

I, Juhee Kim, confirm that this manuscript is original, has not been published previously, and is not under consideration elsewhere. I appreciate your time and consideration, and we look forward to the opportunity to contribute to AI in Education. Please let me know if you require any additional information.

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