

THE EFFECTIVENESS OF ARTIFICIAL INTELLIGENCE (AI) IN TEACHERS' INSTRUCTION PRACTICES

Salizawati Omar¹, Aznan Che Ahmad^{2*}

¹Sekolah Kebangsaan Permatang To' Kandu, Penang, Malaysia

²Universiti Brunei Darussalam, Brunei Darussalam

*Corresponding author: aznan.ahmad@ubd.edu.bn

Abstract: The digital transformation of education has entered a decisive phase with the rapid emergence of generative Artificial Intelligence (AI). This study investigates the effectiveness of AI integration in teaching, focusing on teacher readiness, ethical awareness, and its impact on instructional quality. Using a descriptive quantitative survey design, data were collected from 40 teachers across diverse subject areas and levels of experience. Findings reveal that AI significantly enhances teaching and learning practices: 97.5% of respondents demonstrated understanding of AI fundamentals, 95% agreed that AI accelerates lesson preparation, and 92.5% reported improved creativity in instructional design. Moreover, 90% expressed confidence in guiding students to use AI responsibly. Tools such as ChatGPT and Canva AI emerged as primary enablers for lesson planning, visual materials, and student projects, while Microsoft Copilot and Gemini supported information retrieval. Despite these benefits, challenges remain, particularly limited school infrastructure and concerns about student misuse of AI for unethical practices. To synthesize these findings, the study proposes an AI Integration Framework for Schools, situating Teacher Readiness, Leadership Support, Robust Infrastructure, and Ethical Governance as interdependent dimensions of effective AI adoption. This framework aligns with Malaysia's School Transformation Program 2025 (TS25) and the Digital Education Policy, underscoring that sustainable AI integration requires both grassroots teacher innovation and systemic leadership. Overall, the study demonstrates that AI, when ethically and strategically applied, empowers teachers to deliver more adaptive, inclusive, and future-ready learning experiences.

Keywords: artificial intelligence (AI), teacher readiness, instructional effectiveness, digital education, ts25, ethical governance

INTRODUCTION

The Fourth Industrial Revolution has reshaped global education, with Artificial Intelligence (AI) particularly generative AI, emerging as a powerful pedagogical tool. Generative AI has been shown to reduce teacher workload and streamline lesson planning, making it a valuable pedagogical tool (Chen & Wong, 2022). Beyond technical support, AI is reshaping education globally, offering new opportunities for efficiency and creativity in teaching (Baker, 2021). AI also is driving educational transformation by enabling teachers to plan, implement, and assess teaching more efficiently and creatively. While AI offers transformative potential, it also presents challenges that schools must address to ensure sustainable integration (Selwyn, 2022).

In Malaysia, AI integration aligns with School Transformation Programme 2025 (TS25), which emphasize teacher quality, leadership, and holistic student outcomes. Yet, challenges persist: gaps in digital competency, concerns over academic integrity, and infrastructure limitations. Teachers often balance the desire to innovate with environmental constraints, though both veteran and novice educators show strong motivation to adapt AI, positioning them as drivers of a smart pedagogical ecosystem. Ethical concerns remain central, as

UNESCO (2021) warns that without clear guidelines, AI risks undermining integrity. Effective use therefore depends on teacher readiness, administrative support, continuous training, and comprehensive policies.

This study assesses AI's effectiveness in teaching, focusing on teachers' understanding, ethical readiness, and self-efficacy. It also identifies AI tools with the greatest impact on efficiency and evaluates implications for teaching quality and student learning.

PROBLEM STATEMENT

The need to integrate AI in the classroom is no longer a technical luxury but a professional demand for teachers in facing the Fourth Industrial Revolution. The integration of AI into Malaysian classrooms is closely tied to the TS25 transformation agenda, which emphasizes teacher quality and leadership (Abdullah & Rahman, 2024). However, this transition process is often challenged by the digital competency gap and concerns regarding teachers' professional autonomy. The rationale for this study is rooted in the urgent need to align teaching practices with the Digital Education Policy and the framework of the TS25, particularly in the sub-theme of Quality Teacher Development and Effective Leadership. This alignment is further reinforced by the Ministry of Education's Digital Education Policy, which provides a national framework for digital transformation (Ministry of Education Malaysia, 2023).

Based on preliminary analysis of primary data, there is a significant gap between teachers' desire to innovate and environmental constraints. Although data shows that 90% of teachers are confident in using AI to plan their teaching, there is a tangible concern regarding academic integrity (72.5% of respondents expressed concerns about student misuse). Additionally, school infrastructure constraints remain a fundamental issue hindering the comprehensive implementation of AI. Without empirical action research, interventions conducted at the school level risk being unfocused and fail to address the actual needs of teachers in the field.

The main rationale for this study is to build a data-driven narrative to demonstrate that teachers, ranging from veterans with over 20 years of experience to novice teachers, possess a high intrinsic motivation to adopt AI. This study acts as a bridge to connect technology integration theory with practical classroom practices, ensuring that each step of the transformation is systematically documented to achieve the goals of quality schools and holistic student outcomes.

OBJECTIVES

This study aims to:

- i. Assess teachers' level of understanding, ethical readiness, and self-efficacy in integrating AI into the existing curriculum, with particular attention to issues of academic integrity and responsible use.
- ii. Identify and analyze specific trends in the use and popularity of AI tools that have the highest impact on teachers' work efficiency and creativity.
- iii. Examine infrastructural readiness and support systems (e.g., digital competency, school facilities, administrative backing) that influence the effective integration of AI in teaching and learning.

- iv. Evaluate teachers' ethical awareness and perceptions of AI usage in relation to challenges such as misuse, equity, and inclusivity, ensuring that pedagogical transformation is both meaningful and sustainable.

METHODS

This study adopts a descriptive quantitative survey design to examine teachers' readiness, ethical awareness, and perceptions of Artificial Intelligence (AI) integration in instructional practices. The design was chosen to provide a broad empirical overview of teachers' experiences and attitudes without requiring intervention cycles, ensuring that findings are generalizable within the school context.

Research Instrument

A digital questionnaire was developed using Google Forms, structured into four domains:

1. Demographics (age, years of teaching experience, subject specialization).
2. Frequency and purposes of AI usage (lesson planning, administrative tasks, innovation, assessment).
3. Infrastructural readiness (availability of devices, internet connectivity, administrative support).
4. Ethical awareness and perceptions (concerns about misuse, confidence in guiding students, awareness of integrity issues).

The instrument was reviewed by two subject-matter experts for content validity. Reliability testing using Cronbach's alpha yielded a coefficient of $\alpha = 0.87$, indicating strong internal consistency.

Sampling and Respondents

Purposive sampling was employed to ensure diversity across teaching levels and subject areas. A total of 40 teachers participated, comprising:

- Veteran teachers (>20 years of experience),
- Mid-career teachers (11–20 years), and
- Novice teachers (<5 years).

Subjects represented included Mathematics, Science, Malay Language, Islamic Education, English Language, Design and Technology, Special Education, Preschool, and Music Education. This diversity allowed for a balanced perspective across disciplines and career stages.

Data Collection

The survey was administered over a four-week period. Respondents completed the questionnaire online, ensuring accessibility and efficiency. Participation was voluntary, and confidentiality was maintained throughout.

Data Analysis

Data were analyzed using descriptive statistics (percentages, frequencies) to capture overall trends. Correlation tests (Pearson's r) were conducted to examine relationships between AI usage and teaching effectiveness (e.g., preparation time, creativity, ethical considerations). Findings were triangulated with reflective interpretation of open-ended responses, allowing quantitative results to be contextualized within teachers' lived experiences.

Ethical Considerations

Ethical approval was obtained at the institutional level. Respondents were informed of the study's purpose, assured of confidentiality, and provided consent before participation. The study adhered to principles of responsible research conduct, aligning with the Ministry of Education Malaysia's Digital Education Policy and UNESCO's guidelines on AI ethics in education.

FINDINGS

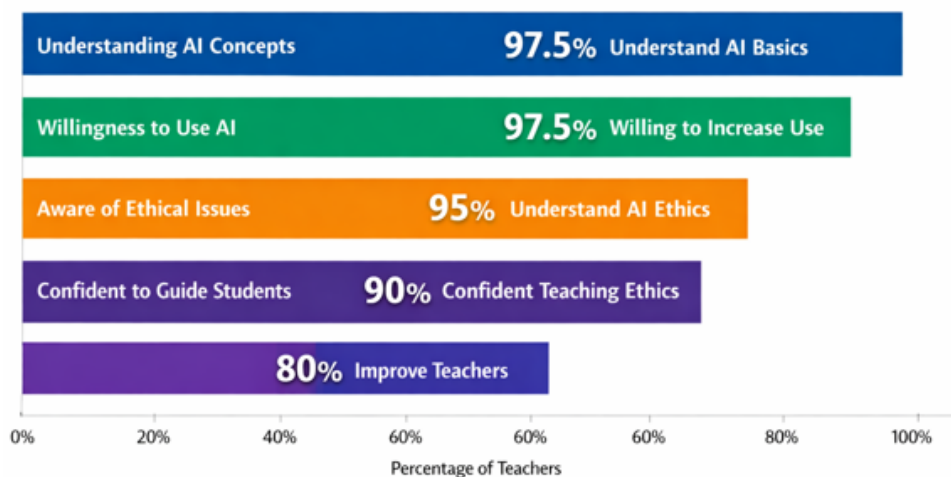
The analysis of this study's findings presents an empirical overview of the position of Artificial Intelligence (AI) in teachers' professional practices. Data obtained from 40 respondents have been synthesized into several key categories, namely readiness levels, popularity of AI tools, purposes and frequency of use, and effectiveness correlations with teaching and learning process.

Teacher Readiness and Perceptions

Figure 1 below illustrates teachers' readiness and ethical awareness regarding AI in education. The results show that factors such as age and teaching experience do not hinder AI acceptance.

Figure 1

Teacher readiness and perceptions of AI integration



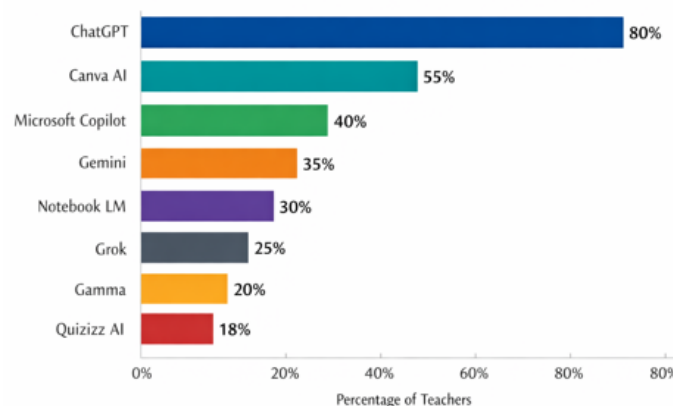
Veteran teachers with over 20 years of experience demonstrate interest equal to that of younger educators, challenging the notion that experienced individuals resist new technology. Overall readiness is high: 97.5% of respondents understand basic AI concepts and express willingness to increase usage. Additionally, 95% report awareness of ethical issues, and 90% are confident in guiding students to use AI responsibly. This finding supports study by Nor Hasniza (2025) who found that ethical readiness remains a critical issue, with surveys in TS25 schools highlighting both awareness and concern about responsible AI use. These findings confirm that teachers are in an active acceptance phase, with strong motivation to continue learning and innovating within AI-augmented pedagogy and support study done by Mohd Nazri and Siti Aminah (2024) who found that teachers' readiness to adopt AI reflects broader trends in Malaysian schools, where studies have highlighted strong motivation among educators to integrate AI into science and other curricula.

Popularity of AI tools among teachers

Figure 2 illustrates the relative popularity of AI platforms used by teachers to support various professional tasks. The data reveal that ChatGPT is the most widely adopted tool, with nearly all respondents reporting its use for text generation, idea development, and PdP material preparation. Recent action studies also confirm that ChatGPT is increasingly accepted by teachers as a tool for 21st-century education (Zulkifli et al., 2023). Its dominance reflects not only its versatility but also its intuitive interface, which allows teachers to produce differentiated questions, lesson plans, and even feedback with minimal effort. ChatGPT's integration into daily teaching routines positions it as a foundational tool in AI-augmented pedagogy.

Figure 2

Popularity of AI tools among teachers



Canva AI ranks second in popularity, particularly among preschool and mathematics teachers, who value its ability to produce visually engaging materials such as posters, slides, and digital worksheets. Its drag-and-drop design features and AI-powered layout suggestions make it accessible even to educators with limited design experience, enhancing the aesthetic quality of teaching aids and boosting student engagement. In addition, Microsoft Copilot and Gemini are used primarily for retrieving current information and summarizing content, supporting teachers in staying updated with educational trends and integrating real-world examples into lessons. These tools are especially useful in subjects that require dynamic content, such as language, humanities, and science. In addition, Notebook LM serves a more specialized role in document management and research note organization, helping teachers streamline their workflow, especially when preparing reports or conducting classroom-based research. Interestingly, the study also highlights a growing trend in the adoption of emerging tools such as Grok, Gamma, and Quizizz AI. While their usage rates are lower, their presence in the data suggests that teachers are actively exploring new innovations. Grok and Gamma offer creative presentation formats and interactive storytelling, while Quizizz AI supports formative assessment through gamified quizzes and adaptive questioning. Their uptake reflects a culture of experimentation and openness to technological evolution within the teaching community.

Overall, these patterns underscore the diversification of AI usage in Malaysian classrooms. Teachers are not relying on a single platform but are strategically selecting tools based on task relevance, whether for

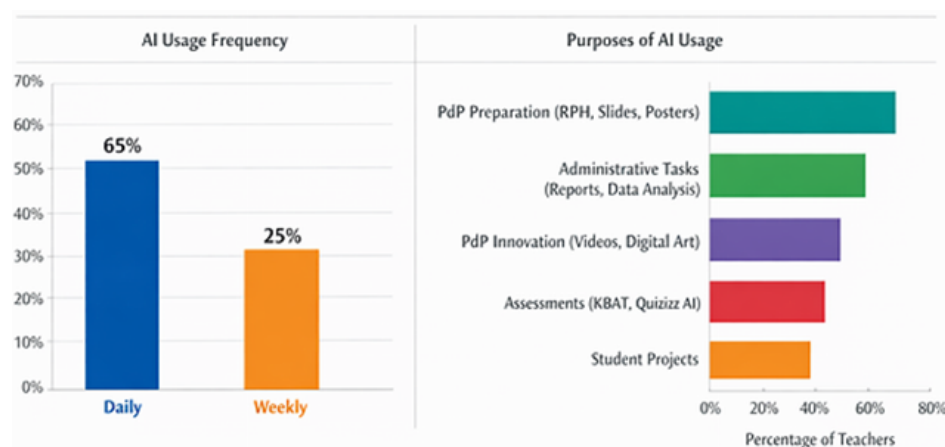
content creation, visual design, information retrieval, or assessment. This multi-tool approach enhances both the efficiency and creativity of teaching practice, reinforcing the emergence of a smart pedagogy ecosystem.

Purposes and frequency of AI usage

The data in Figure 3 shows that AI has become embedded in teachers' daily routines, with 65% of respondents reporting daily use and another 25% reporting weekly use. This high frequency underscores the normalization of AI as a core component of the teaching and learning process, rather than a supplementary tool. The purposes of AI usage span multiple dimensions of professional practice. In teaching preparation, teachers rely on AI to create their lesson plans, generate slides, and design posters, significantly reducing preparation time and enhancing the quality of instructional materials. In administrative tasks, AI supports report writing, student data analysis, and the preparation of working papers, thereby alleviating the burden of routine documentation and allowing teachers to focus more on pedagogy.

Figure 3

Purposes and frequency of AI usage among teachers



Teachers also employ AI for their teaching innovation, producing animated videos, digital drawings, and creative student projects. These applications not only enrich classroom delivery but also foster student engagement through interactive and visually appealing content. In the domain of assessment, AI is used to generate higher-order thinking questions and to build interactive quizzes via platforms such as Quizizz AI. This enables teachers to design assessments that are both challenging and adaptive, supporting differentiated learning.

Taken together, these findings highlight that AI functions as more than a support mechanism has become an essential instrument in the overall teaching and learning ecosystem. Its integration across preparation, administration, innovation, and assessment demonstrates a holistic transformation of teaching practice, where AI enhances efficiency, creativity, and inclusivity. The frequency of use further indicates that teachers are not experimenting with AI sporadically, but are actively embedding it into their professional routines, signaling a shift toward AI-augmented pedagogy at scale.

Correlation of AI usage effectiveness

The data shows a clear positive correlation between AI usage and teachers' work efficiency. As many as 95% of respondents agreed that AI helps expedite the preparation of PdP materials, while 92.5% stated that AI

enhances teaching creativity. Teachers in Islamic Education and Special Education options, in particular, demonstrate highly creative usage in producing tailored teaching aids to meet students' needs. This finding emphasizes that AI not only accelerates routine tasks but also enriches teachers' creativity in producing more effective and inclusive teaching and learning. Subsequently, a Pearson correlation test was conducted, and the study findings indicate a significant relationship between AI usage and teaching effectiveness. For instance, the more frequently teachers use AI, the shorter the time required to prepare teaching materials ($r = -0.68$, $p < 0.001$). The use of Canva AI also shows a strong positive correlation with teaching creativity ($r = +0.72$), while the use of ChatGPT and AI applications in Special Education shows a significant positive correlation with ethical considerations and the adaptation of teaching aids (refer to Table 1).

Table 1
Correlation Between AI Usage and Teaching Effectiveness

AI Usage/Application	Teaching Dimension/Outcome	Correlation (r)
Frequency of AI usage	Time required to prepare teaching materials	-0.68
Canva AI	Teaching creativity	+0.72*
ChatGPT	Ethical considerations	+0.60*
AI in Special Education	Adaptation of teaching aids	+0.55*

DISCUSSION

Emergence of a Smart Pedagogy Ecosystem

The findings of this study highlight a significant development within the Malaysian education system: the gradual emergence of a Smart Pedagogy Ecosystem at the grassroots level. Teachers' readiness, recorded at 97.5%, challenges the outdated narrative that educators resist technological innovation. Instead, the evidence suggests that teachers are entering a phase of AI-augmented teaching, where artificial intelligence functions as a cognitive assistant that alleviates administrative burdens and enhances pedagogical efficiency. This trajectory aligns with broader global trends in digital education transformation (Baker, 2021; Selwyn, 2024), reinforcing the view that AI adoption is becoming integral to contemporary teaching practice rather than a peripheral experiment.

Synthesis of TPACK and AI

Anchored in the Technological Pedagogical Content Knowledge (TPACK) framework (Mishra & Koehler, 2006), teachers in this study demonstrate the ability to integrate technological knowledge (AI) with pedagogical and content expertise. For example, a Mathematics teacher (Respondent ID 31) used AI not merely to retrieve answers but to generate higher-order thinking questions that stimulate critical thinking. This finding supports Zhai's (2023) assertion that ChatGPT offers transformative opportunities for differentiated instruction. The ability to generate tiered questions in seconds strengthens inclusive education by ensuring that students of varying cognitive levels receive appropriate challenges. These practices illustrate how AI can extend the TPACK model into a more dynamic, adaptive framework for 21st-century pedagogy.

Why ChatGPT and Canva AI dominate

The dominance of ChatGPT and Canva AI, reported by 38 out of 40 teachers, is attributed to their accessibility and intuitive interfaces. ChatGPT is widely employed for text generation and idea development,

making it a primary reference for lesson preparation. Canva AI, particularly favored by preschool and mathematics teachers, enables the creation of visually engaging materials that enhance student engagement. These tools allow teachers to automate routine tasks, freeing time for meaningful student interaction. This supports Luckin's (2022) argument that AI will not replace teachers, but rather, teachers who use AI meaningfully will be better positioned to meet future educational demands. While their popularity is clear, emerging tools such as Grok, Gamma, and Quizizz AI suggest that teachers are also experimenting with innovative platforms, reflecting a culture of openness to technological evolution.

Frequency, purpose, and tool popularity

The study reveals that 65% of teachers use AI daily, while 25% use it weekly. AI is employed across multiple domains: teaching preparation (lesson plans, slides, posters), administrative tasks (reports, data analysis), innovation (videos, digital drawings), assessments (Quizizz AI), and student projects. ChatGPT emerged as the most popular tool (80%), followed by Canva AI (55%), Microsoft Copilot (40%), and Gemini (35%). These findings indicate that AI is no longer a supplementary tool but has become embedded in teachers' professional routines. However, while frequency of use is high, the study does not claim causality between AI adoption and improved student outcomes; rather, it highlights correlations that warrant further exploration through longitudinal research.

Leadership Support and Digital Transformation

An important finding is that 95% of teachers feel supported by school administrators and view AI as aligned with institutional digital transformation. This suggests that the TS25 school ecosystem has successfully cultivated a culture of innovation. Nevertheless, ethical concerns remain. Although most teachers claim to understand AI-related ethical issues, many express concern about student misuse. UNESCO (2021) and Smith (2025) caution that without clear ethical guidelines, AI integration may threaten academic integrity. Thus, teacher readiness must be complemented by robust school-level policies, student-focused ethics education, and ongoing professional development to ensure responsible and sustainable AI adoption.

Challenges and solutions

Despite the positive trajectory of AI adoption in Malaysian schools, several challenges must be addressed to ensure sustainable integration. One of the most pressing issues relates to infrastructure limitations. Half of the respondents reported inconsistent internet speeds and limited access to devices, which hindered their ability to fully utilize cloud-based tools such as Gemini and Copilot. Addressing these constraints requires systemic investment in expanding Wi-Fi coverage and securing additional funding, potentially through parental engagement or corporate sponsorship, to ensure equitable access across schools.

Another concern raised by teachers involves student integrity and ethical use of AI. Respondents expressed apprehension about digital plagiarism and the misuse of AI tools for dishonest practices. To mitigate these risks, schools should implement structured workshops such as "*AI Ethics for Students*" and adopt process-based assessments that emphasize learning processes rather than solely focusing on final outputs. These measures would promote responsible use of AI and strengthen academic honesty among students.

Finally, while teachers demonstrated competence in basic AI applications, many highlighted the need for deeper training in prompt engineering proficiency. Effective use of AI requires the ability to craft precise

and contextually relevant prompts, which remains a developing skill among educators. Planned workshops—such as “*Mastery in AI Prompts*” tailored to specific subject areas like Science, Language, and Humanities—are recommended to help teachers align AI outputs more closely with syllabus requirements.

Taken together, these challenges underscore the need for systemic support to ensure that AI integration is equitable, ethical, and pedagogically meaningful. By addressing infrastructure, student integrity, and teacher proficiency in tandem, schools can build a sustainable foundation for AI adoption that enhances teaching quality while safeguarding educational values.

Impact

The integration of AI has yielded measurable impacts across three key dimensions. First, in terms of teacher professionalism, AI has significantly improved time management. Tasks that previously required several hours, such as preparing teaching materials, can now be completed within 15 to 20 minutes. This efficiency not only reduces stress but also boosts teacher morale, allowing educators to redirect their energy toward more meaningful instructional interactions.

Second, the quality of teaching and learning has been enhanced through the use of AI-powered tools. Applications such as PowerPoint Designer and Bing Image Creator enable the production of professional-grade teaching aids that elevate classroom delivery. One teacher (Respondent ID 34) reported a noticeable increase in student engagement when using AI-generated visual materials, affirming AI’s role in enriching the learning experience and making lessons more interactive and appealing.

Third, the dimension of student learning has been positively influenced by AI’s capacity to facilitate differentiated instruction. Teachers can instantly generate multiple levels of questions tailored to varying cognitive abilities, ensuring that students receive appropriately challenging and personalized learning experiences. This reinforces the principles of inclusive education by supporting diverse learner needs within the same classroom environment.

Taken together, these impacts demonstrate that AI functions as a professional amplifier, enabling teachers to deliver more adaptive, creative, and inclusive instruction. However, the sustained realization of these benefits will depend on continued investment in infrastructure, comprehensive ethics training, and ongoing professional development to ensure that AI integration remains equitable, ethical, and pedagogically meaningful.

Practical Implications for School Leaders

The findings of this study carry important implications for school leaders and administrators, particularly within the TS25 transformation agenda. Leadership support emerged as a critical enabler of AI adoption, with 95% of teachers reporting that administrative backing facilitated their integration of AI tools. This underscores the role of principals and senior leaders in shaping a culture of innovation and ensuring that digital transformation is not merely policy-driven but actively embedded in daily practice.

First, school leaders should prioritize capacity building by embedding AI literacy into professional development programs. Structured workshops on prompt engineering, ethical use, and subject-specific applications can empower teachers to move beyond basic AI functions toward more sophisticated pedagogical

integration. Such initiatives align with TS25's emphasis on quality teacher development and ensure that educators are equipped to harness AI responsibly and creatively.

Second, leaders must address infrastructural readiness by advocating for improved connectivity, device access, and digital resource allocation. Partnerships with parents, local communities, and corporate sponsors can help bridge resource gaps, ensuring equitable access to AI tools across schools. This proactive approach prevents digital inequities and supports TS25's goal of holistic student outcomes.

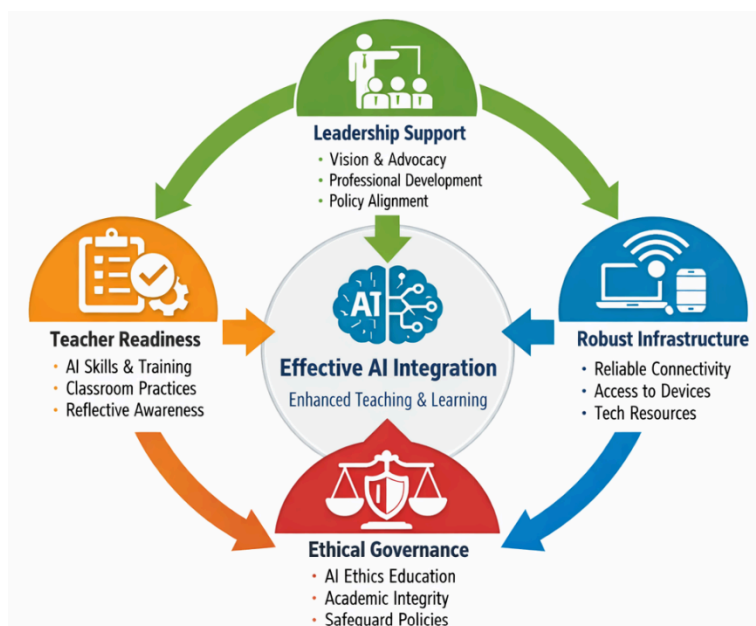
Finally, school leaders should establish clear ethical guidelines and monitoring mechanisms to safeguard academic integrity. By implementing student-focused workshops on AI ethics and shifting toward process-based assessments, administrators can mitigate risks of plagiarism and misuse. This positions schools not only as sites of technological adoption but also as spaces where responsible digital citizenship is cultivated.

Taken together, these practical steps highlight that leadership is central to sustaining AI integration. By combining infrastructural investment, professional development, and ethical governance, school leaders can operationalize AI adoption in ways that reinforce TS25's vision of high-quality, future-ready education.

In addition, this study also produces a conceptual framework (Figure 4) which illustrates the dynamic interplay between four critical dimensions: Teacher Readiness, Leadership Support, Robust Infrastructure, and Ethical Governance, that collectively enable effective AI integration in teaching and learning. Each dimension reflects empirical findings from this study: teachers' high readiness (97.5%), strong administrative support (95%), infrastructural challenges, and ethical awareness. The central outcome, Effective AI Integration, represents the synergy among these dimensions, leading to enhanced teaching quality and student engagement.

Figure 4

AI Integration Framework for Schools



The framework aligns with Malaysia's School Transformation Program 2025 (TS25) and the Digital Education Policy (Ministry of Education Malaysia, 2023), emphasizing that sustainable AI adoption depends on leadership vision, teacher capacity, equitable infrastructure, and ethical governance. The proposed AI

Integration Framework for Schools (Figure X) encapsulates the central contribution of this study by synthesizing empirical findings into a practical model for educational transformation. By situating Teacher Readiness, Leadership Support, Robust Infrastructure, and Ethical Governance as interdependent dimensions, the framework demonstrates that effective AI integration is not a matter of isolated teacher practices but a systemic process requiring coordinated action. This model aligns directly with Malaysia's TS25 transformation agenda and the Digital Education Policy, reinforcing the argument that sustainable AI adoption depends on both grassroots teacher innovation and institutional leadership. As such, the framework provides school leaders, policymakers, and educators with a clear roadmap for embedding AI into teaching and learning in ways that are adaptive, inclusive, and ethically grounded.

CONCLUSION

This study provides strong empirical evidence that teachers are now on the brink of a positive digital revolution through the integration of Artificial Intelligence (AI) in teaching. With a high level of readiness (97.5%) and continuous motivation to learn, AI has proven to be a strategic tool for enhancing educational quality. The findings indicate that AI not only accelerates the preparation of teaching materials but also enriches teachers' creativity in producing more engaging, interactive, and relevant lessons aligned with students' needs. Importantly, AI is not replacing teachers but empowering them to deliver more adaptive and creative instruction, reinforcing the argument that teachers who use AI meaningfully will be better positioned to meet future educational demands.

Although challenges such as digital infrastructure constraints and ethical issues persist, they are not insurmountable. Instead, these challenges open opportunities for systemic improvements, including capacity building for teachers, stronger administrative support, and the formulation of clear ethical guidelines. The effectiveness of AI usage can only be sustained through ongoing commitment from the entire school community, alongside policy support and industry collaboration.

Overall, AI integration not only facilitates teachers' daily tasks but also empowers the profession through more creative, scientific, and inclusive pedagogical practices. AI has emerged as a catalyst for a Smart Pedagogy Ecosystem that supports holistic student outcomes. The proposed AI Integration Framework for Schools (Figure X) synthesizes these findings into a practical model, situating Teacher Readiness, Leadership Support, Robust Infrastructure, and Ethical Governance as interdependent dimensions of effective AI adoption. This framework aligns directly with Malaysia's School Transformation Program 2025 (TS25) and the Digital Education Policy, demonstrating that sustainable AI integration requires both grassroots teacher innovation and systemic leadership.

In conclusion, AI integration has the potential to strengthen differentiated instruction, reduce teacher workload, and support more inclusive and future-ready teaching practices when guided by ethical, pedagogical, and institutional support. By embedding this framework into practice, schools can ensure that AI continues to be the heartbeat of high-quality and impactful educational transformation, advancing both national policy goals and global calls for responsible digital innovation.

Contribution to Knowledge

This study advances the literature on AI in education by providing empirical evidence from Malaysian classrooms, framed within national policy priorities. While global scholarship often emphasizes AI's theoretical potential (Luckin, 2022; Selwyn, 2024), this research demonstrates how teachers actively integrate AI into daily practice, challenging assumptions of resistance and positioning educators as drivers of digital pedagogy.

A key contribution lies in highlighting teacher readiness and ethical awareness as central to sustainable AI adoption. The finding that 90% of teachers expressed confidence in guiding students responsibly extends the discourse beyond efficiency to include integrity, inclusivity, and responsible digital citizenship, aligning with UNESCO's (2021) guidance.

Methodologically, the study contributes by employing a descriptive quantitative survey design with diverse respondents across subject areas and career stages. Correlation analysis provided nuanced insights into how specific tools (e.g., Canva AI, ChatGPT) influence creativity, ethical considerations, and instructional adaptation, strengthening the empirical base for understanding AI's differentiated impacts.

Finally, the development of the AI Integration Framework for Schools represents a conceptual synthesis that bridges empirical findings with policy priorities. By situating readiness, leadership, infrastructure, and ethics as interdependent dimensions, the framework offers a roadmap for school leaders and policymakers. This model contributes to knowledge by demonstrating that effective AI integration is not merely technical enhancement but a systemic process requiring coordinated action across multiple levels of the educational ecosystem.

ORCID

Salizawati Omar: <https://orcid.org/0009-0000-9338-4258>

Aznan Che Ahmad: <https://orcid.org/0009-0000-3744-0091>

REFERENCES

- Baker, T. (2021). *Artificial intelligence in education: Opportunities and challenges*. Educational Technology Review, 29(3), 45–62. <https://doi.org/10.1080/edtech.2021.29.3>
- Luckin, R. (2022). *Machine learning and human intelligence: The future of education in the 21st century*. Routledge.
- Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). *AI and education: Guidance for policymakers*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000376709>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Selwyn, N. (2024). *Education and technology: Key issues and debates* (3rd ed.). Bloomsbury Academic.
- Smith, J. (2025). Ethical challenges of AI in classrooms: Safeguarding academic integrity. *Journal of Digital Ethics in Education*, 12(1), 15–28. <https://doi.org/10.1080/jdee.2025.12.1>
- UNESCO. (2021). *Recommendation on the ethics of artificial intelligence*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000377897>
- Zhai, X. (2023). ChatGPT in education: Opportunities, challenges, and future directions. *Computers and Education: Artificial Intelligence*, 4, 100123. <https://doi.org/10.1016/j.caeai.2023.100123>