Teachers' Readiness towards 21st Century Learning (PAK21) in Malaysia

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ABSTRACT

21st Century Learning, locally known in Malaysia as Pembelajaran Abad ke-21 (PAK21), represents a paradigm shift from rote memorization toward the cultivation of communication, collaboration, critical thinking and creativity (4C skills). This instructional approach aims to produce holistic students capable of navigating the Fourth Industrial Revolution. This report analyzes teacher readiness comprising knowledge, skills and attitudes for PAK21 implementation. Utilizing a document analysis of empirical studies and policy frameworks, the research explores preparedness across geographical and subject-specific contexts. Findings indicate that while teachers possess high theoretical knowledge and positive attitudes, practical skills in digital pedagogy and Higher Order Thinking Skills (HOTS) remain moderate. Significant urban-rural infrastructure disparities persist, necessitating targeted professional development and institutional support to achieve the aspirations of the Malaysia Education Blueprint 2013–2025.

Keywords: Knowledge, skills, attitudes, 21st Century Learning, teachers

INTRODUCTION

Teacher readiness is a multi-dimensional construct involving cognitive, behavioral and affective components (Poh Huoy Tyan, Fadzilah Abd Rahman & Maryam Shafie Sarvestani, 2020). While national initiatives like the DELIMa platform support technology-enhanced instruction, actual implementation is often hindered by internal and external barriers. Current gaps are particularly pronounced in rural schools, where infrastructure limitations exacerbate the digital divide (Sarennia Ravendaran & Nurfaradilla Mohamad Nasri, 2025). Furthermore, the COVID-19 pandemic served as a stress test, exposing structural weaknesses in digital literacy while accelerating the adoption of remote tools (Nor Azira Mohd. Radzi, Majdah Chulan & Azhar Abdul Rahman, 2025). This report synthesizes recent empirical research to identify systemic challenges and inform the training and infrastructure upgrades necessary to strengthen pedagogical practices.

Based on these challenges, the main objectives of this study are:

a) To explore Malaysian teachers' readiness for the implementation of 21st Century Learning (PAK21).

b) To explore the levels of teachers' preparedness across different geographical and subject-specific contexts.

c) To identify gaps and systemic challenges in the practical implementation of PAK21.

Theoretical Framework

The evaluation of teacher readiness is grounded in Bryant's Educational Process Model (1974), which identifies three primary factors for effective learning: input (pedagogical knowledge), instructional action (practical skills) and attitude (perceptions and motivation) (Poh Huoy Tyan, Fadzilah Abd Rahman & Maryam Shafie Sarvestani, 2020). This is supplemented by the Technological Pedagogical Content Knowledge (TPACK) framework and

the Digital Competence Framework for Educators (DigCompEdu) (Fadhilla Nangroe Anggraini et al., 2025). Furthermore, the Malakah concept highlights the importance of subject matter expertise and professional excellence (Mohd Alfouzii Nasir et al., 2025). These dimensions are summarized in Figure 1.1.

Dimension	Component	Description	Theoretical Basis
Cognitive	Knowledge	Theoretical understanding of 4C skills, HOTS and digital pedagogy.	Bryant's Input; TPACK
Behavioral	Skills	Practical ability to implement PBL, flipped classrooms and ICT tools.	Bryant's Action; DigCompEdu
Affective	Attitudes	Perceptions of PAK21, psychological readiness and openness to change.	Bryant's Attitude; TAM
Contextual	Infrastructure	Access to internet, hardware and institutional support systems.	Equity Theory

Figure 1.1: Dimensions of Teacher Readiness in the PAK21 Context

METHODOLOGY

This report utilizes a qualitative document analysis approach as its primary research strategy. The methodology involves the synthesis of ten core journal articles published between 2020 and 2025, which are further supplemented by a broad range of empirical studies, policy documents and systematic literature reviews published up to 2025. The selection criteria for this source material specifically focused on relevance to Malaysian teacher readiness across primary, secondary and pre-university education levels, specifically examining the dimensions of knowledge, skills and attitudes.

Regarding analytical weighting, the study prioritizes second- and third-order insights; this approach moves beyond simple statistical reporting to explore the underlying causes of implementation gaps and the broader ripple effects of various policy interventions. The data extraction process focused on identifying critical themes, including ICT mastery, the integration of Higher Order Thinking Skills (HOTS), rural-urban disparities and the long-term impact of teacher professional development (TPD). This comprehensive review ensures that the findings reflect the diverse socio-economic and pedagogical contexts present within the Malaysian education system.

Research Findings

The following sections synthesize descriptive findings regarding the integration of 21st-century competencies in Malaysian classrooms.

Implementation of 4C Skills

The integration of 4C skills marks the shift from passive absorption to active construction of knowledge (Suhardi Aldi et al., 2025). Synthesis of current literature, as summarized in Figure 1.2, suggests varying degrees of implementation success.

Skill	Frequency of Use	Common Pedagogical Methods	Primary Barrier
Collaboration	High	Group projects, peer reviews, team	Unequal student

		discussions.	participation.
Communication	Moderate-High	Virtual presentations, role-playing, digital forums.	Language proficiency issues.
Critical Thinking	Moderate	Case studies, inquiry-based learning, Socratic questioning.	Rigid curriculum timelines.
Creativity	Moderate	Creative writing, digital design, project-based learning.	Focus on standardized testing.

Figure 1.2: Comparative Implementation of 4C Skills in Malaysian Classrooms

Collaboration is the most commonly integrated skill, particularly in ESL where it facilitates language acquisition (Goh Hock Seng, Maizatulliza Muhamad & Richard Kiely, 2020). Conversely, Critical Thinking and Creativity implementation remains moderate. While teachers conceptually understand HOTS, many struggle to translate this into consistent classroom practice (Suhardi Aldi et al., 2025).

Knowledge and Skill Levels

Malaysian teachers demonstrate high theoretical knowledge of PAK21. However, a gap exists between theoretical awareness and practical depth. For instance, teachers may use Google Classroom for organization but fail to use it for deep historical inquiry or critical discussion.

Practical skill levels, visualized in Figure 1.3, are frequently described as moderate. While the pandemic improved basic ICT proficiency, the ability to design interactive, student-centered digital instruction remains limited.

Pedagogical Domain	Proficiency Level	Description
Basic ICT Skills	High	Proficient in LMS navigation and digital communication.
Interactive Pedagogy	Moderate	Struggling to move beyond passive delivery of content.
HOTS Application	Moderate	Challenges in designing high-order assessment items.
Collaborative Management	Moderate-High	Strong ability to manage small-group activities.
AI and Emerging Tech	Low-Moderate	Limited exposure to intelligent tutoring systems or analytics.

Figure 1.3: Teacher Skill Levels by Pedagogical Category

Attitudes and Contextual Disparities

Teachers generally hold positive perceptions toward PAK21 (Goh Hock Seng et al., 2020). However, psychological barriers such as high workloads and perceived pedagogical "burdens" can lead to burnout (Khatijah Mohamed Badri et al., 2025). Furthermore, the rural-urban digital divide creates a psychological barrier; rural teachers may feel discouraged by infrastructure limitations, leading to lower motivation compared to urban counterparts (Sarennia Ravendaran & Nurfaradilla Mohamad Nasri, 2025).

DISCUSSION AND FUTURE OUTLOOK

The synthesized data reveals that teacher readiness for PAK21 in Malaysia is at a transformative crossroads. The initial phase of awareness-building has been largely successful, as evidenced by the high levels of knowledge and positive attitudes reported by teachers across various studies(Fadhilla Nangroe Anggraini, Muh. Nur Rochim Maksum, Mohammad Zakki Azani, Lutfi Azzahrowaini, Fauzan Addinul Jihad & Saminur Fauzan, 2025). However, the "implementation gap" which is the distance between theoretical understanding and classroom practice remains a significant hurdle(Reem Alomoush, 2025).

Interpretive Insights on Professional Development

There is a clear causal relationship between technology training and readiness (K.H. Abdullah et al., 2025). However, current "one-size-fits-all" training is often inadequate (Arzizul Antin & Dg Norizah, 2025). Future professional development should prioritize "pedagogical adaptability" to help teachers translate basic ICT skills into "transformative instruction" . Additionally, proactive school leadership is essential for enhancing teachers' readiness (Zaifudin Zainol & Zulkifli Abdullah, 2025).

Policy Implications: IR 4.0 and AI

As Malaysia moves toward Education 4.0, the integration of AI will become increasingly important (Fadhilah Jamaluddin, Ahmad Hakiim Jamaluddin & Faridzah Jamaluddin, 2025). This requires a structural shift in both pre-service and in-service training . AI offers potential to personalize learning, but only if teachers are equipped to manage these systems effectively . Equitable resource distribution is vital for national prosperity and reducing social inequality .

CONCLUSION

This study analyzes teacher readiness through cognitive, behavioral and affective lenses, highlighting that while theoretical knowledge and positive dispositions are high, substantial gaps in practical skills and infrastructural support persist . Readiness is not uniformly distributed; rural educators face persistent challenges related to digital access and inconsistent connectivity.

The findings suggest that strengthening PAK21 requires a comprehensive strategy addressing infrastructure, pedagogy and governance simultaneously . Teacher professional development must transition from fragmented initiatives toward continuous, personalized and subject-specific training models that emphasize the practical integration of HOTS and interactive pedagogy . National assessment practices should be realigned to authentically value 4C skills, thereby reinforcing pedagogical practices that prioritize critical inquiry over rote preparation . Future research and teacher education must also embed competencies related to artificial intelligence and IR 4.0 to prepare educators for emerging global demands

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