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Challenges Faced by Malaysian Educators in Integrating Artificial Intelligence into Education: An Exploratory Systematic Review

马来西亚教育工作者在人工智能教育整合过程中面临的挑战：一项探索性系统综述

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Abstract: The rapid integration of Artificial Intelligence (AI) into education has attracted increasing attention globally; however, systematic understanding of the challenges faced by Malaysian educators remains limited. This study presents an exploratory systematic review of empirical research published between 2020 and 2025, focusing specifically on educator-centred challenges in AI adoption within Malaysian educational contexts. A total of eight peer-reviewed studies were analysed using a narrative synthesis approach. The findings reveal four interconnected challenge domains: concerns regarding the accuracy of AI-generated content and its implications for academic integrity, the absence of clear institutional governance frameworks, insufficient AI literacy, training, and professional development among educators, and socio-psychological barriers related to role adaptation, identity conflict, and technology anxiety. These

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challenges indicate that AI integration is not solely a technical issue, but a complex organisational and human-centred process. The review further highlights that weaknesses in one domain often reinforce challenges in others. For example, limited training reduces educators' ability to critically evaluate AI outputs, while the absence of institutional policies increases uncertainty in managing academic integrity issues. Similarly, unresolved psychological concerns may reduce educators' willingness to engage with AI tools, even when technical resources are available. Based on these findings, the study emphasises the need for a holistic and coordinated approach to AI integration in Malaysian education. This includes the development of clear and context-sensitive governance frameworks, the redesign of professional development programmes to support sustained and differentiated learning, and the provision of socio-psychological support through collaborative and mentoring structures. This study contributes to the emerging body of literature by providing a comprehensive synthesis of educator-focused challenges in AI adoption within the Malaysian context. It offers practical insights for policymakers, institutional leaders, and educators seeking to move beyond superficial AI adoption toward meaningful and sustainable pedagogical transformation.

Keywords: Artificial Intelligence in Education, Malaysian Educators, AI Challenges, Teacher Professional Development, Academic Integrity, Digital Pedagogy

摘　要：人工智能（AI）在教育领域的快速融合已引起全球关注，但对马来西亚教育者所面临挑战的系统性认识仍较有限。本研究对2020年至2025年间发表的相关实证研究进行探索性系统综述，采用叙事综合方法分析8篇同行评审文献，聚焦教育者在人工智能应用中的核心困境。研究发现四个相互关联的挑战领域：人工智能生成内容的准确性及其对学术诚信的影响、制度治理框架的缺失、教育者人工智能素养与专业发展不足，以及与角色适应、身份冲突和技术焦虑相关的社会心理障碍。这些挑战表明，人工智能整合不仅是技术问题，更是一个复杂的组织与人本过程，且各领域之间相互强化，如培训不足削弱批判性评估能力，政策缺失加剧学术诚信管理不确定性，心理顾虑则降低技术使用意愿。基于此，本研究强调需采取整体性与协同化路径推进人工智能整合，包括构建情境化治理框架、优化持续性与差异化的专业发展机制，以及通过协作与导师支持缓解社会心理压力。本研究为理解马来西亚教育情境下教育者面临的人工智能应用挑战提供了综合性视角，并为实现有意义且可持续的教学转型提供实践启示。

关键词：人工智能教育，马来西亚教育者，人工智能挑战，教师专业发展，学术诚信，数字教学法

1. Introduction

The emergence of Artificial Intelligence (AI) as a transformative force in global education has been rapid and far-reaching. Technologies such as AI-powered chatbots, automated assessment tools, personalised learning platforms, and intelligent tutoring systems are increasingly reshaping education practices (Jen & Salam, 2024). In Malaysia, this transformation is influenced by national digitalisation efforts, post-pandemic shifts towards blended and online learning, and the broader ambitions of the Education 4.0 agenda outlined in the Malaysia Education Blueprint (Mohd Jamil et al., 2024). While these developments create significant opportunities for improving educational delivery, they also introduce new complexities for educators who are required to integrate AI into their daily teaching practice.

Despite the growing interest in AI adoption, existing evidence suggests that successful integration is not automatic. Educators, as the primary agents of implementation, face multiple challenges that extend beyond technical usage. These challenges include concerns about the reliability and appropriateness of AI-generated content, uncertainty regarding institutional expectations, limited access to structured training, and difficulties in adapting to new teaching roles. In Malaysia's higher education sector, which serves more than 1.3 million students across over 100 institutions (Muniisvaran et al., 2025), these challenges have become increasingly significant. The effectiveness of AI in education depends not only on technological availability but also on educators' readiness, confidence, and ability to use these tools meaningfully.

However, the current body of literature on AI in Malaysian education remains largely student focused. Many studies examine areas such as student acceptance of AI tools (Yahaya et al., 2024) and learning performance outcomes (Ram Sing et

al., 2025), while fewer studies explore the challenges faced by educators themselves. Existing research that includes educators is often limited to specific institutions or subject areas, which restricts broader understanding. In addition, there is limited integration of key dimensions such as institutional policy, professional development, and socio-psychological adaptation within a single analytical framework. As a result, the challenges of AI adoption among Malaysian educators remain fragmented and insufficiently synthesised.

This study addresses this gap by conducting an exploratory systematic review of empirical studies published between 2020 and 2025. A total of eight peer-reviewed studies were selected based on strict inclusion criteria, focusing specifically on educator-related AI adoption challenges in Malaysian educational contexts. The small number of studies reflects the emerging nature of this research area rather than a limitation of the review. Due to the diversity in research methods, contexts, and participant groups, a narrative synthesis approach was adopted to allow a more in-depth and context-sensitive interpretation of findings. The review aims to identify and synthesise the key challenges faced by Malaysian educators in adopting AI in education. This review is guided by the following research questions:

RQ1: What are the primary categories of challenges that Malaysian educators face when adopting AI in their educational practice?

RQ2: In what ways do the reviewed studies indicate differences in AI adoption challenges across educational levels and career stages?

RQ3: What recommendations emerge from the literature to support Malaysian educators in overcoming these challenges?

By answering these questions, this study contributes to a more integrated understanding of AI adoption challenges across individual, institutional, and socio-cultural levels. It also provides practical insights for policymakers, institutional leaders, and educators to support more effective and sustainable AI integration in Malaysian education. Rather than viewing AI adoption as a purely

technical issue, this study highlights the importance of aligning governance, professional development, and educator readiness in achieving meaningful educational transformation.

2. Literature Review

2.1 AI in Malaysian Education: An Overview

The integration of technology into Malaysian education has a well-documented trajectory that accelerated significantly in the aftermath of the COVID-19 pandemic. Mohd Jamil et al. (2024) document how the pandemic served as a catalyst for accelerated adoption of AI and Information and Communication Technology (ICT) in Malaysian Technical and Vocational Education and Training (TVET) institutions, highlighting both the opportunities and the structural challenges this acceleration has produced. Similarly, Muniisvaran et al. (2025) confirm that technology-enhanced learning has transformed traditional instructional methods in Malaysian higher education, with smart devices and AI-integrated platforms increasingly mediating education interactions. These changes represent a fundamental shift in the nature of pedagogical practice, requiring educators to develop new competencies and adapt established teaching approaches.

Within this context, AI tools have been deployed for a diverse range of educational purposes. Jen and Salam (2024), conducting a systematic review of AI use in essay writing spanning a decade of global research, found that generative AI tools such as ChatGPT have begun to reshape writing pedagogy in Malaysian universities, functioning as idea generators, feedback providers, and co-authors. Yahaya et al. (2024) examined students' acceptance of AI chatbots for virtual collaborative learning in Malaysian public universities. They found that perceived ease of use was the strongest predictor of chatbot adoption, a finding that underscores the importance of usability and accessibility in AI integration efforts. These studies highlight the diverse applications of AI technology across the Malaysian educational spectrum, from secondary schools to postgraduate programmes.

At the secondary school level, Tian and Jiang (2025) investigated the role adaptation processes of Malaysian secondary physics teachers in AI-assisted experimental teaching, revealing that 72.4% of teachers experienced varying degrees of role identity conflict during the technology integration process. This figure is striking and points to a dimension of the AI challenge that goes beyond mere technical competence, touching instead on deeper questions of professional identity, pedagogical authority, and the relational dynamics of teaching. The prevalence of role identity conflict among nearly three-quarters of participating teachers underscores the magnitude of psychological and professional adjustment required by AI integration.

Together, these studies paint a picture of an educational system in transition one that has embraced the possibilities of AI in principle but continues to grapple with the practical, ethical, and human dimensions of its implementation. The following sections synthesise the key challenge domains emerging from this literature.

2.2 Theoretical Framework: Understanding AI Adoption Challenges

This review is grounded in three complementary theoretical perspectives that collectively inform the interpretation of AI adoption challenges among Malaysian educators. Rather than relying on a single explanatory model, a multi-theoretical approach is adopted to capture the technical, institutional, and socio-psychological dimensions of AI integration.

First, the Technology Acceptance Model (TAM) provides a foundational lens for understanding educators' behavioural intentions to adopt AI tools. According to TAM, perceived usefulness and perceived ease of use are key determinants influencing technology acceptance (Yahaya et al., 2024). Within the Malaysian educational context, this framework is particularly relevant as educators must evaluate whether AI tools enhance teaching effectiveness while remaining manageable within existing pedagogical and institutional constraints. TAM therefore explains the cognitive evaluation process underlying AI adoption decisions.

Second, Desimone's (2009) framework for effective professional development offers an institutional perspective by outlining five core features of impactful training: content focus, active learning, coherence, duration, and collective participation. This framework provides a structured basis for assessing the adequacy of current AI-related training initiatives for educators. In the context of this review, it is used to evaluate whether existing professional development practices are sufficient to support sustained behavioural and pedagogical change, rather than short-term or superficial technology use.

Third, the socio-psychological model of role adaptation proposed by Tian and Jiang (2025), based on a cognition–emotion–behaviour framework, highlights the affective and identity-related dimensions of AI integration. This perspective extends beyond technical competence by recognising that educators' responses to AI are shaped not only by knowledge, but also by emotional reactions such as anxiety and uncertainty, as well as behavioural adjustments in teaching practice. The model is particularly useful in explaining role identity conflict and technology-related stress, which are prominent challenges identified in the Malaysian context.

Taken together, these three frameworks support a multi-level understanding of AI adoption challenges. TAM addresses individual cognitive evaluations, Desimone's model focuses on institutional capacity and training structures, while the socio-psychological framework captures emotional and identity-based responses. This integrated perspective reflects the reality that AI adoption is not purely a technical issue, but a complex process involving human behaviour, organisational systems, and socio-cultural context.

In the Malaysian education setting, where institutional diversity and varying levels of digital readiness exist, such a multi-dimensional approach is essential. It allows for a more nuanced interpretation of the barriers faced by educators and supports the development of more holistic and context-sensitive strategies for AI integration. Ultimately, this theoretical grounding reinforces the view that successful AI adoption requires alignment between technological capability, institutional support, and human readiness.

Figure 1 illustrates the integrated theoretical structure guiding the present review. At the core, AI integration in Malaysian education is positioned as a complex process involving educator adoption and adaptation. To explain this process, three interconnected theoretical lenses are applied: the Technology Acceptance Model, Desimone's (2009) effective professional development framework, and the cognition–emotion–behaviour model proposed by Tian and Jiang (2025).

Each framework represents a distinct analytical perspective. TAM explains individual cognitive evaluations such as perceived usefulness and ease of use, which influence educators' intention to adopt AI. Desimone's framework captures institutional conditions, particularly the structure and effectiveness of professional development. The socio-psychological model explains emotional responses, identity adaptation, and behavioural change during AI integration.

These three lenses are synthesised into a multi-level analytical framework, which reflects how AI adoption challenges operate across individual, institutional, and socio-cultural levels. The final outcome, as shown in the figure below, is the need for context-sensitive AI integration support, which aligns policy, professional practice, and educator identity within the Malaysian education system.

This integrated theoretical perspective is visually represented in Figure 1, which demonstrates how the three theoretical lenses interact to explain AI adoption challenges across multiple levels. The figure highlights the transition from individual cognitive and emotional responses to broader institutional and socio-cultural conditions, ultimately leading to the need for context-sensitive AI integration strategies. This visual framework supports the interpretation of findings in subsequent sections.

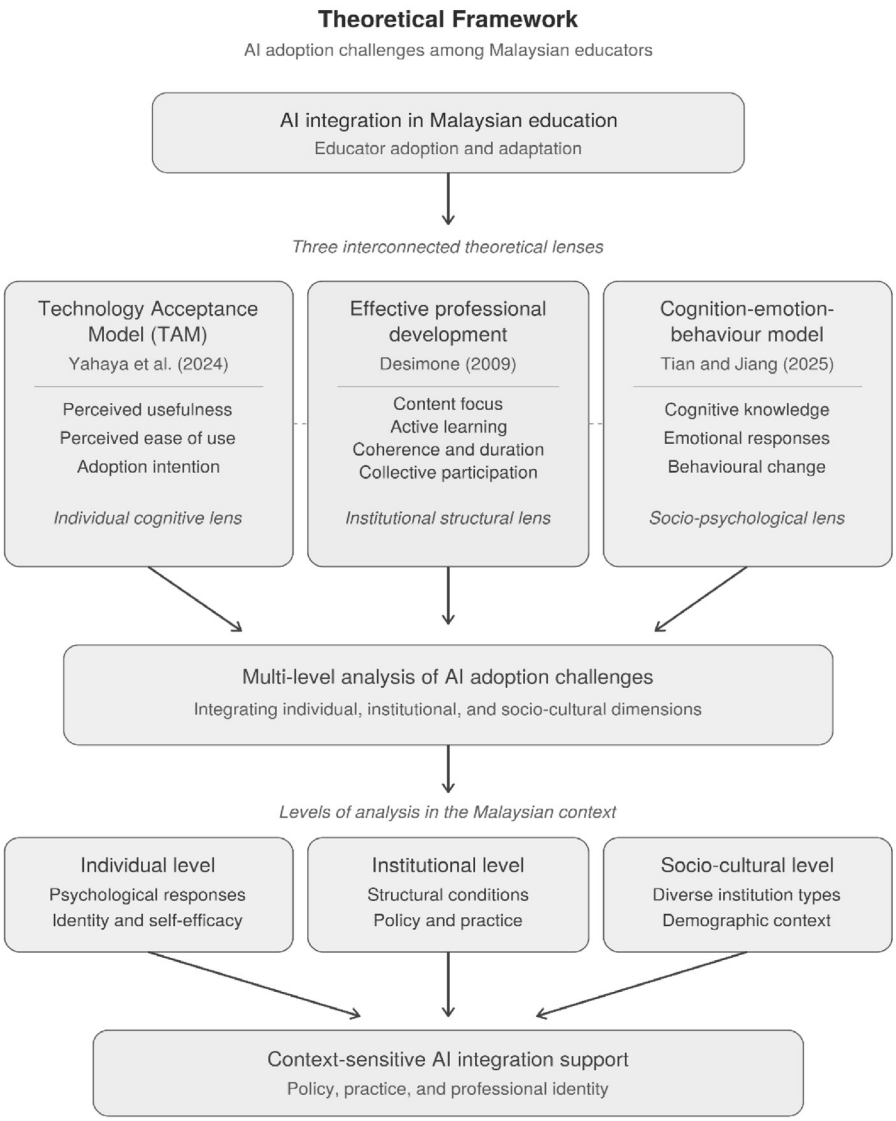


Figure 1: Conceptualisation of AI Adoption Challenges Among Malaysian Educators

3. Methodology

3.1 Research Design

This study uses a systematic review approach to bring together existing research on the challenges faced by Malaysian educators when adopting Artificial Intelligence in education. A systematic review is suitable for this study because

it allows the researcher to identify, organise, and compare findings from different studies in a clear and structured way. The review was guided by the PRISMA framework, but it was adapted to suit the nature of education research. This is because studies in education often use different methods, samples, and research settings. As shown in Table 3, the selected studies cover different educational contexts, including higher education, secondary schools, and TVET institutions. The studies also used different research methods, such as interviews, surveys, mixed methods, fuzzy Delphi technique, thematic analysis, and systematic literature review.

The study selection process was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page et al., 2021), as illustrated in Figure 2. The initial database search returned 412 records from Scopus (n = 138), Google Scholar (n = 215), and the Malaysia Citation Index (My Cite) (n = 59). An additional 18 records were identified through citation searching of reference lists (n = 14) and hand-searching of Malaysian educational journals (n = 4). After 87 duplicate records were removed, 343 records were screened by title and abstract, of which 287 were excluded for reasons such as not focusing on the Malaysian context (n = 124), not being related to AI in education (n = 86), focusing solely on students (n = 41), being non-empirical commentary (n = 28), or being available only as conference abstracts (n = 8).

A total of 56 reports were sought for full-text retrieval, of which 9 could not be accessed due to subscription or availability issues. The remaining 47 reports were assessed for eligibility against the inclusion and exclusion criteria described in Section 3.2. Of these, 39 were excluded for the following reasons: did not address educator-related challenges (n = 17), conducted outside the Malaysian context (n = 11), insufficient methodological detail (n = 6), duplicate publication of the same study (n = 3), and published before 2020 (n = 2). This screening process resulted in a final sample of 8 studies that met all inclusion criteria and were synthesised using the narrative thematic analysis approach described in Section 3.4.

The final sample of eight studies, although small, represents the available body of empirical research that directly addresses educator-centred AI adoption challenges in the Malaysian context. This number reflects the emerging nature of the research area rather than a limitation of the search strategy. To ensure transparency, all screening decisions were documented, and any disagreements during the eligibility stage were resolved through discussion among the authors.

A total of eight peer-reviewed studies were included in the final review. Although the number of studies is small, it reflects the current stage of research on AI adoption challenges among Malaysian educators. Many existing studies on AI in education focus more on students, learning performance, or general technology acceptance. Fewer studies focus directly on educators and the practical challenges they face when using AI in education. Therefore, the eight studies selected for this review provide a focused and relevant basis for understanding the issue.

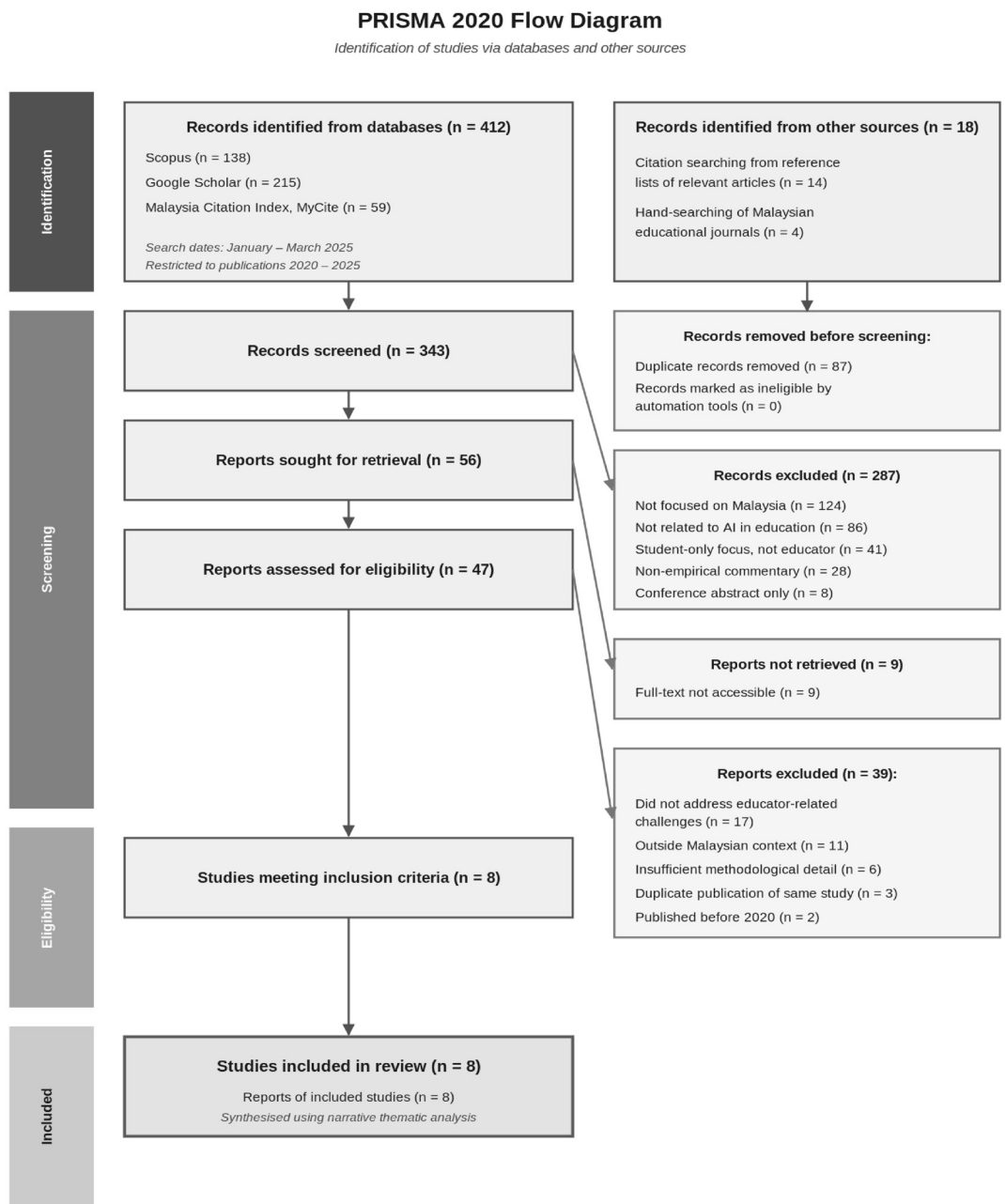
Due to the differences in research methods, participants, and study contexts, this review used a narrative synthesis approach rather than a meta-analysis. A meta-analysis was not suitable because the included studies did not use similar statistical measures or comparable outcome variables. Narrative synthesis was more appropriate because it allowed the findings to be interpreted across different types of studies while still preserving the meaning of each study.

Overall, this research design allows the study to examine AI adoption challenges in a more balanced and context-sensitive way. It also supports the purpose of this review, which is to understand the main issues faced by Malaysian educators and to identify common patterns across the available literature.

3.2 Inclusion and Exclusion Criteria

This study applied specific inclusion and exclusion criteria to ensure that only relevant and high-quality studies were selected for the review. Articles were included if they met the following conditions. First, the study must be published between 2020 and 2025 to ensure that the findings reflect recent developments in Artificial Intelligence in education. Second, the study must be empirical in nature, involving primary data collection such as surveys, interviews, or mixed methods.

Third, the study must focus on the Malaysian educational context or include Malaysia as part of its analysis. Fourth, the study must address challenges, barriers, or issues related to AI adoption in education, particularly from the perspective of educators.



Source: Adapted from Page MJ, McKenzie JE, Bossuyt PM, et al. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ, 372:n71. doi:10.1136/bmj.n71

Figure 2: PRISMA 2020 flow diagram for the systematic review of AI adoption challenges among Malaysian educators

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On the other hand, studies were excluded if they focused only on students' performance, general technology use, or theoretical discussions without empirical data. Articles that did not clearly address AI-related challenges or were not accessible in full text were also excluded. These criteria ensured that the selected studies were directly relevant to the research objective and provided meaningful insights into the challenges faced by Malaysian educators.

3.3 Data Sources and Search Strategy

A systematic search was conducted to identify peer-reviewed studies addressing the challenges faced by Malaysian educators in adopting Artificial Intelligence in education. Three primary academic databases were selected to ensure comprehensive coverage of both international and local Malaysian scholarship: Scopus, Google Scholar, and the Malaysia Citation Index (My Cite). Scopus was chosen for its broad indexing of peer-reviewed international journals in education and technology. Google Scholar was included to capture additional scholarly sources, including open-access publications, that may not be indexed in Scopus. My Cite was selected to ensure adequate representation of Malaysian-authored research, including studies published in regional and national journals that may not appear in international databases. The searches were carried out between 1 January 2025 and 31 March 2025.

The search strategy was developed using a combination of controlled vocabulary and free-text terms organised around four key concepts: (1) Artificial Intelligence and related technologies, (2) education and pedagogical settings, (3) the Malaysian context, and (4) educators and challenges of adoption. Within each concept, synonyms and related terms were combined using the Boolean operator OR, while the four concepts were combined using AND to ensure that retrieved studies addressed all four dimensions. Truncation (*) was applied where supported to capture word variants (for example, "educator*" to retrieve "educator" and "educators"). Quotation marks were used for exact-phrase matching of multi-word terms such as "artificial intelligence" and "higher education". Table 1 presents the full Boolean search string used in each database, the filters applied, and the number of records retrieved.

Table 1: Database-Specific Search Strings, Filters, and Records Retrieved

Database	Boolean Search String	Filters Applied	Records Retrieved
Scopus	TITLE-ABS-KEY ((“artificial intelligence” OR “AI” OR “ChatGPT” OR “generative AI” OR “machine learning”) AND (“education” OR “teaching” OR “learning” OR “pedagogy” OR “higher education” OR “TVET” OR “secondary school”) AND (“Malaysia” OR “Malaysian”) AND (“challenge*” OR “barrier*” OR “issue*” OR “adoption” OR “acceptance” OR “readiness” OR “integration”) AND (“educator*” OR “teacher*” OR “lecturer*” OR “instructor*” OR “academic*”))	Years: 2020-2025 Document type: Article, Review Language: English Source type: Journal	138
Google Scholar	(“artificial intelligence” OR “AI” OR “ChatGPT”) AND (“education” OR “teaching” OR “higher education” OR “TVET”) AND (“Malaysia” OR “Malaysian”) AND (“challenges” OR “barriers” OR “adoption”) AND (“educators” OR “teachers” OR “lecturers”) Note: Google Scholar does not support full Scopus-style syntax; the simplified string was used and the first 250 results (sorted by relevance) were screened.	Years: 2020-2025 Language: English Citations & patents: excluded	215
Malaysia Citation Index (MyCite)	(“Artificial Intelligence” OR “AI” OR “ChatGPT”) AND (“education” OR “teaching” OR “learning”) AND (“challenges” OR “barriers” OR “adoption”) AND (“teachers” OR “lecturers” OR “educators”) Note: The Malaysia filter is implicit, since MyCite indexes only Malaysian-affiliated publications.	Years: 2020-2025 Document type: Journal article Language: English & Bahasa Malaysia	59
Citation searching	Backward citation tracking of reference lists from the 8 most relevant articles identified in the database search; forward citation tracking via Google Scholar‘s ‘Cited by’ function for the same set.	Years: 2020-2025	14

Hand-searching	Manual search of the table of contents (2023-2025) of: • Journal of Technical Education and Training • Jurnal Komunikasi: Malaysian Journal of Communication • Malaysian Journal of Learning and Instruction • Asian Journal of University Education	Years: 2023-2025	4
Total	All sources combined (before duplicate removal)	-	430

Several restriction filters were applied across all databases to ensure relevance and methodological consistency. These filters reflect the inclusion and exclusion criteria described in Section 3.2 and are summarised in Table 2.

Table 2: Summary of Restriction Filters Applied During the Search

Restriction Type	Specification
Publication period	1 January 2020 - 31 March 2025 (inclusive). The 2020 starting point reflects the post-pandemic acceleration of AI adoption in Malaysian education.
Language	English (primary). For My Cite, articles in Bahasa Malaysia were also screened, with translation assistance used for full-text review where required.
Document type	Peer-reviewed journal articles and systematic reviews. Conference abstracts, editorials, opinion pieces, theses, and grey literature were excluded.
Geographic scope	Studies conducted in Malaysian educational settings, or international studies that included Malaysia as part of a comparative analysis.
Subject focus	Studies addressing educator-related challenges, barriers, or adaptation issues in AI integration. Student-only acceptance studies were retained only when they provided indirect evidence relevant to educator practice.
Methodology	Empirical studies (qualitative, quantitative, mixed methods, or systematic reviews) with clearly described data collection and analysis procedures.
Access	Full-text accessibility through institutional subscription or open access.

In addition to the structured database searches, two supplementary search techniques were applied to reduce the risk of missing relevant studies. First, backward citation tracking was carried out by manually reviewing the reference lists

of the most relevant articles identified during the database search. Second, forward citation tracking was performed using the Google Scholar "Cited by" function for the same set of articles. Together, these techniques yielded an additional 14 records. A targeted hand-search of the 2023-2025 issues of four Malaysian education journals (Journal of Technical Education and Training; Jurnal Komunikasi: Malaysian Journal of Communication; Malaysian Journal of Learning and Instruction; and Asian Journal of University Education) yielded a further 4 records. These supplementary techniques are increasingly recommended in systematic reviews of emerging research areas, as database indexing may lag behind the publication of new studies.

Across all sources, a total of 430 records were initially identified. After removal of 87 duplicates, 343 records were screened by title and abstract, and 56 reports were retrieved for full-text assessment. Detailed screening outcomes are presented in the PRISMA 2020 flow diagram (Figure 2) in the following section. To minimise selection bias, all screening decisions were independently reviewed by the second author, and disagreements were resolved through discussion. The complete search log, including the date of each database query and the number of records retrieved, was retained by the authors and is available upon request.

3.4 Data Extraction and Thematic Analysis

After the relevant studies were identified and selected, the data were systematically extracted and analysed using a thematic synthesis approach. A structured data extraction process was used to ensure consistency across all eight studies. Key information was recorded from each article, including the author and year, research context, methodology, participant profile, and main focus of the study, as presented in Table 3.

The analysis was carried out in several stages. First, each study was carefully read to understand its main findings related to AI adoption challenges. Important points, statements, and observations from each study were then highlighted and coded. At this stage, open coding was used to identify recurring ideas without restricting them to predefined categories. In the second stage, similar codes were

grouped together to form broader categories. For example, issues related to trust, accuracy, and reliability of AI outputs were grouped under one category, while issues related to lack of training, skills, and knowledge were grouped under another. This process helped to organise the data in a more meaningful way.

In the final stage, these categories were further refined into four main themes that represent the key challenges faced by Malaysian educators. These themes are AI accuracy and academic integrity concerns, absence of institutional policy and governance, insufficient AI literacy and professional development, and role adaptation and socio-psychological barriers. The use of thematic synthesis was appropriate for this study because the included articles used different research methods and involved different participant groups. This approach allowed the findings to be compared and interpreted across qualitative, quantitative, and mixed-methods studies while maintaining the original context of each study. Overall, this analysis approach ensured that the findings were systematically developed, clearly structured, and closely aligned with the research objectives of the study.

Although this review focuses on educator-related challenges, several selected studies involved student participants. These studies were retained because they provide indirect but relevant evidence on the AI learning environment in Malaysian education. Student-focused studies help to show issues such as AI acceptance, ethical concerns, academic integrity, and technology-enhanced learning conditions, which directly influence educators' teaching practice, assessment design, and institutional responsibilities. Therefore, these studies were used only as supporting evidence and were not treated as direct educator-experience studies. It should be noted that the eight studies presented in Table 3 constitute the formal evidence base of this systematic review. Other sources cited in the manuscript, such as theoretical references (e.g., Desimone, 2009) and contextual studies from neighbouring regions (e.g., Yulianto et al., 2025), are used to inform the theoretical framework and to provide comparative discussion respectively and are not part of the synthesised body of empirical evidence.

Table 3 presents the key characteristics of the studies included in this review, covering the research context, methodology, participant profile, and main focus of analysis. The table highlights the diversity of educational settings, including higher education, secondary schools, and TVET institutions in Malaysia, as well as studies with broader international perspectives. It also shows the variation in research methods used, such as qualitative, quantitative, mixed methods, and review-based approaches. This diversity provides a comprehensive understanding of how AI adoption challenges are explored across different contexts and participant groups. Overall, the table serves as a foundation for the thematic analysis by organising the selected studies in a clear and systematic manner.

Table 3: Characteristics of Included Studies on AI Adoption in Malaysian Education

Author(s) & Year	Context	Method	Participants	Key Focus
Pitchan & Azmi (2025)	UKM, Higher Education	Qualitative (In-depth interviews)	6 lecturers	AI experiences & challenges in T&L
Muniisvaran et al. (2025)	Sultan Idris Univ., HE Malaysia	Mixed methods	425 students	Technology-enhanced learning strengths and weaknesses
Tian & Jiang (2025)	Secondary schools, Malaysia	Explanatory sequential mixed methods	420 teachers, 30 interviews, 6 FGDs	Teacher role adaptation to AI-assisted teaching
Yahaya et al. (2024)	UTEM, Higher Education	Quantitative (Survey)	376 students	AI chatbot acceptance in virtual learning
Jen & Salam (2024)	UTM, Higher Education	Systematic literature review	Systematic review of 10 years of studies	AI use in essay writing; educator implications
Mohd Jamil et al. (2024)	TVET, Malaysian tertiary education	Fuzzy Delphi Technique	Expert panel	Inclusive digital pedagogy in TVET

Ram Sing et al. (2025)	UNITAR & INTI International, Malaysia	Qualitative (Thematic analysis)	29 DBA/MBA students	AI impact on student learning; ethical considerations
Salas-Pilco et al. (2022)	Global (incl. Malaysia)	Systematic review	30 studies across 16 countries/ regions	AI and learning analytics in teacher education

*Studies involving students were included as indirect contextual evidence where their findings were relevant to educator responsibilities and AI integration challenges.

4. Findings

The thematic synthesis of the eight reviewed studies identified four major challenge domains faced by Malaysian educators when integrating Artificial Intelligence (AI) into education. These domains are: concerns about AI-generated information accuracy and academic integrity, absence of clear institutional policy and governance, insufficient AI literacy and professional development, and role adaptation pressure and socio-psychological barriers. These findings are closely connected to the theoretical framework, as they reflect individual cognitive concerns, institutional support limitations, and socio-psychological adaptation challenges.

4.1 AI Accuracy, Trust, and Academic Integrity Concerns

The first major finding concerns educators' uncertainty about the accuracy, reliability, and trustworthiness of AI-generated information. This challenge is closely linked to the Technology Acceptance Model (TAM), particularly the dimensions of perceived usefulness and perceived ease of use. When educators are unsure whether AI outputs are accurate or pedagogically suitable, their confidence in using AI as a teaching support tool may be reduced.

Pitchan and Azmi (2025) found that Malaysian lecturers were concerned that AI tools may generate incorrect, misleading, or contextually inappropriate information. This creates an additional responsibility for educators, as they must

verify AI-generated content before using it in teaching materials or recommending it to students. In this sense, AI does not automatically reduce teaching workload; instead, it may create a new form of verification burden for educators.

Academic integrity also emerged as a major concern. Educators reported difficulties in identifying whether students' written work was genuinely produced by students or heavily assisted by AI tools. This issue is especially important in writing-based assessments, where originality, critical thinking, and student voice are central to learning. Jen and Salam (2024) similarly noted that AI-assisted writing raises questions about authorship, attribution, and the educational purpose of writing tasks.

Therefore, the issue of AI accuracy is not only a technical problem. It also affects trust, assessment fairness, and educators' willingness to accept AI in education. This finding suggests that Malaysian educators need clearer guidance and stronger AI literacy to evaluate AI outputs critically and manage academic integrity risks more effectively.

4.2 Absence of Institutional Policy and Governance Frameworks

The second finding relates to the lack of clear institutional policies and governance frameworks for AI use in education. This challenge cuts across all three theoretical lenses in the framework. From a TAM perspective, unclear policies reduce educators' confidence in adopting AI. From Desimone's professional development perspective, weak institutional direction limits the coherence of training and support. From the socio-psychological perspective, policy uncertainty may increase educators' anxiety and hesitation.

Pitchan and Azmi (2025) found that lecturers faced uncertainty because their institutions had not yet developed clear guidelines on acceptable AI use in teaching, assessment, and student work. Without institutional guidance, educators must make their own decisions about how AI should be used or restricted. This may lead to inconsistent practices across departments, programmes, and individual lecturers.

Mohd Jamil et al. (2024) also highlighted that although Malaysia has broader digital education ambitions, the translation of national-level digital goals into practical institutional policies remains incomplete. This creates a gap between policy aspiration and classroom-level implementation. Educators may be encouraged to use digital or AI tools, but they may not receive enough procedural guidance on ethical use, data privacy, assessment design, or student accountability.

This finding shows that AI governance is a foundational issue. Without clear institutional frameworks, other challenges become more serious. Educators may feel less protected, students may be unclear about acceptable AI use, and institutions may struggle to ensure fairness and consistency. Therefore, governance should be treated as an essential condition for sustainable AI integration.

4.3 Insufficient AI Literacy, Training, and Professional Development

The third major finding concerns the lack of AI literacy, structured training, and sustained professional development among educators. This finding strongly aligns with Desimone's (2009) framework for effective professional development, which emphasises content focus, active learning, coherence, duration, and collective participation. The reviewed literature suggests that many existing AI-related training efforts are still fragmented, short-term, and insufficiently connected to educators' real teaching needs.

Pitchan and Azmi (2025) found that some lecturers had limited exposure to the broader range of AI tools available for education. Many educators mainly associated AI with ChatGPT, which shows a narrow understanding of AI's pedagogical possibilities. This limited exposure may prevent educators from using AI creatively for lesson planning, formative feedback, personalised learning, assessment redesign, or student support.

Muniisvaran et al. (2025) similarly reported that while technology-enhanced learning has increased in Malaysian higher education, educators' knowledge of newer digital and AI tools remains uneven. In some cases, students may adapt to technology faster than educators, creating pressure on lecturers and teachers to catch up with changing digital learning environments.

Tian and Jiang (2025) further showed that AI readiness differs across educators, especially between younger and older teachers. Their findings suggest that technology anxiety and adaptation pressure are strongly related, indicating that training cannot focus only on technical skills. It must also help educators build confidence, reduce fear, and understand how AI can support rather than replace their professional role.

Overall, this finding indicates that professional development must be more systematic and career-stage-sensitive. Educators at different levels of experience require different forms of support. Early-career educators may need foundational AI literacy, mid-career educators may need pedagogical innovation training, and senior educators may need confidence-building support through mentoring and peer learning.

4.4 Role Adaptation Pressure and Socio-Psychological Barriers

The fourth finding highlights the socio-psychological challenges educators face when adapting to AI-supported teaching environments. This finding is closely connected to the cognition–emotion–behaviour model used in the theoretical framework. AI adoption is not only influenced by what educators know, but also by how they feel and how they adjust their teaching behaviour.

Tian and Jiang (2025) found that many Malaysian secondary school physics teachers experienced role identity conflict during AI-assisted teaching. Educators reported concerns related to professional authority, instructional control, and changes in their traditional teaching role. This suggests that AI may challenge how educators understand their identity as teachers, knowledge providers, and classroom leaders.

Technology anxiety also appeared as an important barrier. Some educators may feel uncertain, pressured, or less confident when required to use AI tools in teaching. This anxiety may be stronger among educators who have limited training, less institutional support, or lower exposure to digital technologies. Therefore, role adaptation cannot be separated from the training and governance issues discussed earlier.

In addition, cultural and contextual concerns were also identified within the included studies. Tian and Jiang (2025) reported that Malaysian secondary teachers experienced difficulty aligning AI outputs with local pedagogical and linguistic contexts. This challenge is reinforced by broader regional evidence; for example, Yulianto et al. (2025), in a study of BIPA classrooms in Indonesia (cited here for comparative context rather than as one of the eight included studies), noted that AI-generated language and content may not always reflect local cultural and linguistic realities. Such concerns are particularly relevant in Malaysia, where classrooms are multilingual and multicultural. Educators may therefore need to adapt or correct AI outputs so that they are suitable for Malaysian learners.

This finding shows that AI integration involves emotional, professional, and cultural adjustment. Educators need more than access to AI tools; they also need supportive environments where they can experiment, share concerns, and gradually develop confidence. Professional Learning Communities, peer mentoring, and culturally responsive AI practices may help reduce these socio-psychological barriers.

Overall, the findings demonstrate that AI adoption challenges among Malaysian educators are multi-dimensional and interconnected. Accuracy and integrity concerns affect educators' trust in AI. Lack of institutional policy creates uncertainty and inconsistent practice. Insufficient training limits educators' capability and confidence. Role adaptation pressures influence emotional readiness and professional identity.

These findings support the theoretical framework by showing that AI integration must be understood at three levels: individual, institutional, and socio-cultural. At the individual level, educators evaluate AI based on trust, usefulness, ease of use, and confidence. At the institutional level, policy, training, and governance determine whether educators receive proper support. At the socio-cultural level, professional identity, emotional readiness, and cultural relevance shape the sustainability of AI adoption.

Thus, successful AI integration in Malaysian education requires more than technological availability. It requires clear governance, structured professional development, ethical assessment practices, and socio-psychological support that responds to the realities of Malaysian educators.

5. Discussion: Implications for Policy and Practice

The findings of this study highlight four key challenge domains faced by Malaysian educators in integrating Artificial Intelligence (AI) into education. These include concerns regarding AI accuracy and academic integrity (Section 4.1), the absence of institutional governance frameworks (Section 4.2), insufficient AI literacy and professional development (Section 4.3), and socio-psychological barriers related to role adaptation (Section 4.4). These domains are not isolated; rather, they are interconnected and collectively shape the overall effectiveness of AI adoption in educational contexts. This section discusses the implications of these findings for policy and practice.

5.1 Strengthening AI Governance and Institutional Policy

The findings in Section 4.2 clearly show that the absence of formal institutional policies creates uncertainty among educators regarding appropriate AI usage. This governance gap not only affects teaching practices but also intensifies concerns related to academic integrity identified in Section 4.1. When clear guidelines are not available, educators are forced to make individual judgments about AI use, which may lead to inconsistency and increased risk of misuse among students.

Therefore, higher education institutions in Malaysia must urgently develop structured and transparent AI governance frameworks. These policies should clearly define acceptable and unacceptable uses of AI in teaching, assessment, and research activities. In addition, institutions should provide clear procedures for handling academic misconduct involving AI-generated content. Importantly, policy development should involve educators from different career stages to ensure that the guidelines are practical, inclusive, and contextually relevant. By

addressing the governance gap, institutions can reduce uncertainty and build educator confidence in AI integration.

5.2 Redesigning Professional Development for AI Integration

The findings in Section 4.3 indicate that many educators lack sufficient exposure to AI tools and training opportunities. This limitation directly affects their ability to manage issues related to AI accuracy and verification, as discussed in Section 4.1. Without proper training, educators may rely on a limited understanding of AI, often associating it only with tools such as ChatGPT, which restricts their ability to explore broader pedagogical applications.

To address this issue, professional development programmes must move beyond short-term workshops and adopt a more structured, continuous, and differentiated approach. Based on the variation in AI readiness identified in Section 4.3, training programmes should be tailored according to career stages. For example, early-career educators may require foundational AI literacy, while experienced educators may benefit more from advanced pedagogical integration strategies. Furthermore, professional development should follow principles such as sustained duration, active engagement, and collaborative learning. Institutions should also integrate AI training into existing education development frameworks rather than treating it as an optional or isolated initiative. This approach will ensure that educators are not only technically prepared but also pedagogically confident in using AI tools.

5.3 Addressing Academic Integrity and Assessment Redesign

The concerns related to AI-generated content accuracy and academic integrity, as highlighted in Section 4.1, have significant implications for assessment practices. Educators face challenges in distinguishing between student-generated and AI-assisted work, which raises questions about fairness, originality, and learning outcomes.

To respond to this issue, institutions and educators must rethink traditional assessment methods. Instead of relying heavily on written assignments that can be easily generated by AI, alternative assessment strategies should be considered.

These may include oral presentations, in-class assessments, reflective journals, and project-based evaluations that require higher levels of critical thinking and personal engagement.

At the same time, rather than completely restricting AI usage, educators should guide students on ethical and responsible AI use. This includes teaching students how to verify AI-generated information, cite AI assistance appropriately, and use AI as a support tool rather than a replacement for learning. By shifting from a control-based approach to a guidance-based approach, educators can better align assessment practices with the realities of AI integration.

5.4 Supporting Socio-Psychological Adaptation and Professional Identity

The findings in Section 4.4 reveal that AI integration is not only a technical challenge but also a psychological and professional one. Many educators experience role identity conflict, technology anxiety, and uncertainty about their position in AI-supported learning environments. These challenges are further intensified by the lack of training (Section 4.3) and policy clarity (Section 4.2), showing the interconnected nature of the problem.

To address these socio-psychological barriers, institutions must provide supportive environments that encourage gradual adaptation rather than immediate transformation. One effective approach is the establishment of Professional Learning Communities (PLCs), where educators can share experiences, discuss challenges, and learn from each other in a collaborative setting.

In addition, mentoring programmes and peer support systems can help reduce technology anxiety, especially among senior educators who may feel less confident in adopting new technologies. Emotional and psychological support should be recognised as an important component of AI integration, rather than being overlooked as an individual issue.

Furthermore, attention should also be given to cultural and contextual relevance, as identified in Section 4.4. AI tools must be adapted to reflect Malaysia's multilingual and multicultural educational environment. Without such adaptation, educators may continue to face difficulties in aligning AI outputs with local teaching contexts.

5.5 Integrating a Holistic Approach to AI Adoption

Taken together, the findings suggest that AI integration in Malaysian education requires a holistic and coordinated approach. Addressing only one aspect, such as training or policy, will not be sufficient. For example, improving training without clear policies may still create uncertainty, while strong policies without adequate training may limit effective implementation.

Therefore, institutions should adopt an integrated strategy that simultaneously addresses governance, professional development, assessment practices, and socio-psychological support. This multi-dimensional approach will ensure that AI integration is sustainable and meaningful, rather than superficial or inconsistent.

6. Conclusion

This exploratory systematic review set out to examine the challenges faced by Malaysian educators in integrating Artificial Intelligence (AI) into education. Drawing on eight empirical studies published between 2020 and 2025, four key challenge domains were identified: concerns related to AI-generated content accuracy and academic integrity, the absence of clear institutional governance frameworks, insufficient AI literacy and professional development, and socio-psychological barriers associated with role adaptation and technology anxiety.

These findings collectively suggest that AI integration in Malaysian education is not merely a technical issue, but a complex organisational and human-centred challenge. As discussed in the preceding section, the absence of institutional policies (Section 4.2) amplifies uncertainties surrounding academic integrity (Section 4.1), while limited training provision (Section 4.3) constrains educators' ability to critically evaluate and effectively utilise AI tools. At the same time, the socio-psychological pressures identified in Section 4.4 highlight that educators are required to renegotiate their professional roles and identities in response to AI-driven pedagogical changes. These interconnected challenges reinforce the need for a holistic and coordinated approach to AI adoption.

In response, this study emphasises three critical areas for institutional action. First, higher education institutions must establish clear, practical, and context-sensitive AI governance frameworks that guide both educators and students in the ethical and effective use of AI. Second, professional development initiatives must be redesigned to provide sustained, structured, and career-stage-differentiated training that goes beyond basic tool familiarity and supports meaningful pedagogical integration. Third, institutions must recognise and address the socio-psychological dimensions of AI adoption by fostering supportive environments, such as Professional Learning Communities and mentoring systems, which can reduce anxiety and support gradual adaptation.

Importantly, this study also highlights that addressing these challenges in isolation will not produce effective outcomes. Instead, AI integration requires an integrated strategy that aligns policy development, educator training, assessment redesign, and emotional support mechanisms. Only through such a comprehensive approach can AI move from superficial adoption to meaningful transformation within Malaysian education.

While this study contributes to the growing literature by focusing specifically on educator-centred challenges in the Malaysian context, it is limited by the small number of available empirical studies. This limitation reflects the emerging nature of the field rather than a weakness of the study itself. Future research should therefore focus on longitudinal and comparative studies that examine how educators' AI competencies, attitudes, and practices evolve over time across different institutional settings. In addition, more context-specific research is needed to explore how AI tools can be adapted to Malaysia's multilingual and multicultural educational environment.

In conclusion, the successful integration of AI in Malaysian education will depend not on the availability of advanced technologies, but on the extent to which institutions are able to support, guide, and empower educators in navigating this transition. By addressing governance gaps, strengthening professional capacity, and recognising the human dimension of technological change, Malaysian

educational institutions can create a more sustainable and effective pathway for AI-enhanced education.

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