

Teachers' Readiness to Adopt Artificial Intelligence (AI) in Special Education: A Systematic Literature Review

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ABSTRACT

The rapid advancement of Artificial Intelligence (AI) technology has increasingly influenced various aspects of education, including the field of Special Education. AI has the potential to support teachers in providing more flexible, personalised, and inclusive learning experiences that address the diverse needs of students with special educational needs (SEN). However, teachers' readiness to adopt and integrate AI into Special Education practices remains a significant concern, particularly in relation to their knowledge, skills, perceptions, and access to supporting resources. Therefore, this study aims to identify teachers' readiness to adopt AI in Special Education, examine the factors influencing their readiness, and explore the challenges associated with AI implementation based on previous studies. This study employed a Systematic Literature Review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework. Relevant articles were retrieved from the Scopus, Web of Science, and Google Scholar databases. A total of 86 articles were identified, and after applying the inclusion and exclusion criteria, 14 articles were selected for thematic analysis. The findings reveal that most teachers demonstrate positive perceptions and willingness to explore the potential of AI in teaching and learning. Teachers' readiness is influenced by several factors, including professional training, digital literacy, technological experience, support from school management, availability of digital infrastructure, and AI-related policies. Nevertheless, challenges remain, including limited AI training opportunities, variations in digital competency, ethical concerns, and technological infrastructure constraints. In conclusion, strengthening teachers' AI competencies through continuous professional development, establishing clear guidelines for ethical AI integration, and improving digital facilities are essential to support the effective and responsible adoption of AI in Special Education.

Keywords: artificial intelligence, teacher readiness, Special Education, students with special educational needs, Systematic Literature Review

INTRODUCTION

The rapid advancement of digital technology in the era of the Fourth Industrial Revolution (IR 4.0) has brought significant transformations across various sectors, including education. AI has emerged as a promising technology that can support teaching and learning practices by enhancing instructional processes both inside and outside the classroom. According to UNESCO (2021) and OECD (2023), AI has the potential to facilitate adaptive learning, provide real-time feedback, and improve learning management systems. Moreover, recent developments in generative AI have further expanded its potential in supporting self-directed learning and strengthening student-centred teaching approaches (UNESCO, 2023).

In Special Education, the application of AI has gained increasing attention due to its potential to address the diverse abilities and learning needs of students with SEN, including students with Autism Spectrum Disorder, dyslexia, and other learning disabilities. AI-based technologies, such as intelligent systems, adaptive learning

platforms, and assistive communication tools, can be personalised according to individual students' needs. Recent studies have highlighted the potential of AI in supporting inclusive learning environments and enhancing student engagement (Hussein et al., 2025; Fitas, 2025). Therefore, AI integration in Special Education represents an important area that requires further investigation.

In Malaysia, initiatives towards educational digitalisation have been actively implemented through various policies and programmes that emphasise technology integration in teaching and learning. However, the effectiveness of AI implementation largely depends on teachers' readiness as the key practitioners responsible for classroom implementation. Teachers' readiness involves multiple dimensions, including knowledge, skills, attitudes, and acceptance of emerging technologies. Previous studies have indicated that digital literacy and technology acceptance significantly influence teachers' willingness and ability to integrate technology into educational practices (Hu & AlSaqqaf, 2021; Siong & Bity Salwana Alias, 2024). Thus, teachers' readiness represents a critical factor in determining the successful adoption of AI in education.

This study is guided by the Technology Acceptance Model (TAM) proposed by Davis (1989), which provides a theoretical perspective for understanding teachers' acceptance and readiness towards AI adoption in Special Education. TAM highlights two primary determinants of technology acceptance, namely perceived usefulness and perceived ease of use. In the educational context, teachers are more likely to adopt AI when they perceive the technology as beneficial in supporting instructional preparation and addressing the diverse learning needs of students with SEN. Therefore, overcoming perceptions related to technological complexity is essential to enhance teachers' confidence and willingness to implement AI-based practices.

Despite the growing interest in AI applications, previous studies suggest that teachers' readiness towards AI adoption remains at a moderate level. Although teachers generally demonstrate positive attitudes towards AI, limited knowledge and skills in applying AI for teaching purposes remain significant barriers (Yue, Jong, & Ng, 2024). Other challenges include insufficient professional training, limited understanding of AI applications, ethical concerns related to data privacy, and uncertainty regarding system reliability (UNESCO, 2021; OECD, 2023). Furthermore, the rapid evolution of AI technology creates additional challenges for teachers in maintaining relevant knowledge and competencies.

In Malaysia, studies have also reported that teachers' readiness towards digital technology adoption remains influenced by several factors, including digital literacy, teaching experience, and organisational support (Siti Noor Ismail et al., 2022; Siong & Bity Salwana Alias, 2024; Nur Erma Suryani Mohd Jamel et al., 2025). Hu and AlSaqqaf (2021) found that teachers' acceptance of technology is closely associated with their perceptions of usefulness and ease of use. However, a gap remains between positive technology perceptions and teachers' actual capacity to implement technology effectively. This issue is particularly significant in Special Education, as teachers must ensure that AI applications are not only technologically accessible but also appropriate to the abilities, characteristics, and learning needs of students with SEN.

Although research on AI in education has expanded, much of the existing literature has focused on general education contexts, technological infrastructure, and teacher training. Research specifically examining teachers' readiness to adopt AI in Special Education remains limited. Existing studies also tend to examine isolated factors, such as digital literacy or technology acceptance, without providing a comprehensive synthesis of teachers' readiness, influencing factors, and implementation challenges. The limited availability of systematic literature reviews in this area further restricts understanding of the current evidence base. Therefore, a systematic analysis is necessary to synthesise existing findings, identify research gaps, and provide directions for future studies.

Accordingly, this SLR aims to identify teachers' readiness to adopt AI in Special Education, analyse the factors influencing teachers' readiness towards AI integration, and examine the challenges faced by teachers in implementing AI within Special Education settings. Through systematic synthesis of previous empirical studies, this review seeks to provide a comprehensive understanding of the current landscape of AI adoption in Special Education and contribute valuable insights for researchers, teacher education institutions, and policymakers in developing effective strategies to support inclusive and responsive digital education.

Research Objectives

This study aims to:

1. Identify the level of teachers' readiness to adopt AI in Special Education based on existing empirical studies.
2. Analyse the factors influencing teachers' readiness towards AI adoption and integration in Special Education.
3. Examine the challenges faced by teachers in adopting and implementing AI in Special Education settings.

METHODOLOGY

Research Design

This study employed a SLR approach to systematically identify, evaluate, and synthesise previous empirical studies related to teachers' readiness to adopt AI in Special Education. The review was conducted based on the PRISMA 2020 guidelines (Page et al., 2021), which provide a transparent and replicable framework for identifying, screening, selecting, and synthesising relevant literature. The SLR approach was selected because it enables researchers to consolidate evidence from multiple studies, identify recurring patterns, highlight inconsistencies, and determine existing knowledge gaps within a particular research area (Snyder, 2019).

The study adopted a qualitative synthesis through thematic analysis to examine previous empirical findings on teachers' readiness towards AI adoption in Special Education. This approach enabled the researcher to identify common themes across studies and develop a comprehensive understanding of teachers' readiness, factors influencing AI adoption, and challenges associated with AI implementation in Special Education settings.

Data Sources and Search Strategy

Relevant literature was retrieved from three major academic databases: Scopus, Web of Science (WoS), and Google Scholar. Scopus and Web of Science were selected because they index high-quality, peer-reviewed international publications, while Google Scholar was included to broaden the scope of literature retrieval, particularly for relevant regional and Malaysian studies. Using multiple databases enhanced the comprehensiveness of the search and reduced the likelihood of omitting relevant studies.

The literature search was conducted between 6 April 2026 and 19 April 2026. The search strategy was developed based on three key concepts aligned with the research objectives: AI, teacher readiness, and Special Education. To improve the precision and relevance of the search results, keywords related to these concepts were combined using the Boolean operators AND and OR.

The search terms included "artificial intelligence," "AI," "generative AI," "teacher readiness," "teacher preparedness," "teacher competency," "teacher acceptance," "teacher perception," "special education," "inclusive education," "special needs," and "disability." To ensure comprehensive coverage of local publications, Malay search terms such as "kecerdasan buatan," "kesediaan guru," "penerimaan guru," "kompetensi guru," "persepsi guru," and "pendidikan khas" were also incorporated into the search strategy. The complete search strings used across the selected databases are presented in Table 1.

Table 1. Search Strategy and Keywords

Database	Search String
Scopus	("artificial intelligence" OR AI OR "generative AI") AND ("teacher readiness" OR "teacher preparedness" OR "teacher competency" OR "teacher acceptance" OR "teacher perception") AND ("special education" OR "inclusive education" OR disability OR "special needs")

Web of Science	("artificial intelligence" OR AI OR "generative AI") AND ("teacher readiness" OR "teacher preparedness" OR "teacher competency") AND ("special education" OR "inclusive education")
Google Scholar (English)	("artificial intelligence" OR AI OR "generative AI") AND ("teacher readiness" OR "teacher preparedness" OR "teacher acceptance") AND ("special education" OR "special needs" OR disability)
Google Scholar (Malay)	("kecerdasan buatan" OR AI OR "AI generatif") AND ("kesediaan guru" OR "penerimaan guru" OR "kompetensi guru" OR "persepsi guru") AND ("pendidikan khas" OR "pendidikan inklusif" OR "murid berkeperluan khas" OR ketidakupayaan)

Inclusion and Exclusion Criteria

The inclusion and exclusion criteria were established to ensure that the selected studies were relevant, reliable, and aligned with the objectives of this systematic literature review. These criteria provided a systematic framework for identifying and selecting empirical studies related to teachers' readiness to adopt AI in Special Education. The application of predefined criteria also enhanced the transparency and consistency of the study selection process by ensuring that only studies meeting the predetermined requirements were included for further analysis.

The inclusion criteria consisted of studies that examined teachers' readiness, perceptions, acceptance, competencies, or experiences related to AI adoption or integration in Special Education contexts. Studies involving teachers, educators, or teaching professionals as participants were considered eligible for inclusion. The review included peer-reviewed journal articles, conference proceedings, and empirical studies published between 2021 and 2026. Studies published in English and Malay were also included to capture relevant international and local evidence related to AI integration in Special Education.

Meanwhile, studies were excluded if they did not focus on AI applications or Special Education contexts, involved students only without examining teachers' perspectives, or were unrelated to educational settings. Publications without clear research methodology, limited accessibility, and non-peer-reviewed sources such as books, editorials, blogs, and popular articles were also excluded to maintain the quality and credibility of the reviewed evidence. The complete inclusion and exclusion criteria applied during the study selection process are presented in Table 2.

Table 2. Inclusion and Exclusion Criteria for Study Selection

Criteria	Inclusion Criteria	Exclusion Criteria
Research scope	Studies related to teachers' readiness towards AI adoption in Special Education	Studies unrelated to AI or Special Education
Participants	Teachers, educators, or teaching professionals	Students only without teacher involvement
Document type	Peer-reviewed articles, conference proceedings, empirical studies	Books, editorials, blogs, non-peer-reviewed reports
Research field	Education, Special Education, educational technology, AI in education	Non-educational fields
Publication period	2021–2026	Before 2021
Language	English and Malay publications	Other languages
Database source	Studies retrieved from recognised academic databases	Unreliable or non-academic sources
Geographical context	Studies from various countries and educational contexts	Not applicable

Article Selection Process

The article selection process was conducted systematically based on the PRISMA 2020 framework to ensure transparency, consistency, and replicability throughout the literature screening process. The selection process involved four main stages, namely identification, screening, eligibility assessment, and final inclusion. These stages were implemented to systematically evaluate the retrieved records and ensure that only studies aligned with the research objectives were included for thematic analysis.

During the identification stage, a total of 86 records were retrieved from three selected databases, comprising 75 articles from Google Scholar, 9 articles from Scopus, and 2 articles from Web of Science (WoS). Following the initial screening of publication dates, 11 articles were excluded as they did not meet the predetermined publication period criteria. The remaining 75 articles proceeded to the screening stage, where titles and abstracts were assessed based on their relevance to teachers' readiness towards AI adoption in Special Education. At this stage, 52 articles were excluded because they did not directly address the research focus, particularly in relation to teacher readiness, AI integration, or Special Education contexts.

The remaining 23 articles underwent a full-text assessment during the eligibility stage to determine their suitability based on the established inclusion and exclusion criteria. Following this evaluation, 9 articles were excluded due to insufficient relevance or incomplete information, resulting in 14 studies that fulfilled all selection requirements. These final studies were subsequently included for data extraction and thematic analysis to identify patterns related to teachers' readiness, influencing factors, and challenges associated with AI adoption in Special Education. The complete article selection process is illustrated in Figure 1.

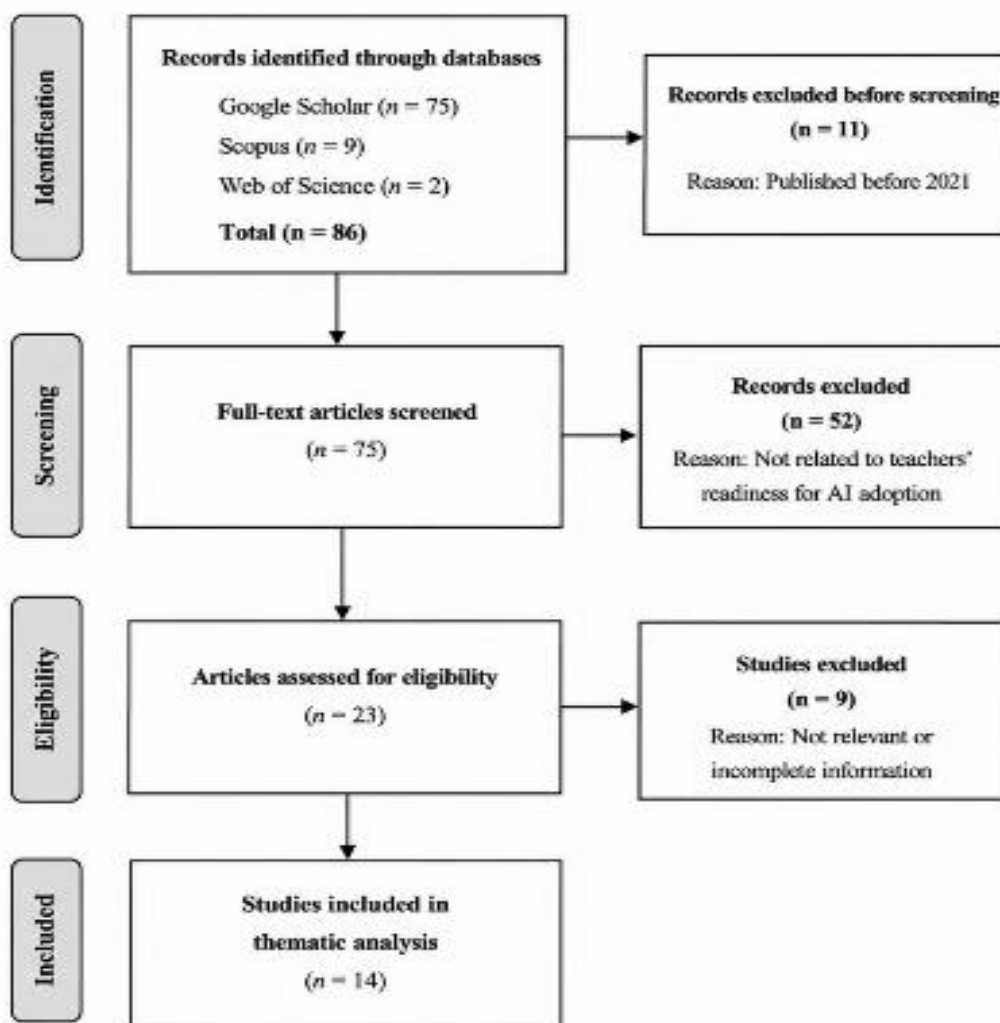


Figure 1. PRISMA Flow Diagram of the Article Selection Process

Data Extraction Process

Following the completion of the article selection process, data extraction was conducted to systematically organise and synthesise relevant information from the selected studies. The purpose of this process was to ensure that key information from each included article was consistently recorded and analysed in accordance with the objectives of this systematic literature review. A structured literature analysis matrix was developed to facilitate the organisation, comparison, and interpretation of findings across the selected studies.

The extracted information included authors' names, publication year, research context, participant characteristics, educational settings, research methodology, data collection instruments, analytical approaches, and key findings related to teachers' readiness towards AI adoption in Special Education. This structured extraction process enabled the researcher to identify similarities, differences, and recurring patterns across the selected studies, while ensuring that relevant evidence related to teachers' readiness, influencing factors, and challenges in AI integration was systematically captured.

The extracted data from the 14 included studies were subsequently organised and summarised based on their characteristics and major findings. This summary provided an overview of the existing empirical evidence and served as the foundation for the subsequent thematic analysis. The characteristics and key findings of the selected studies are presented in Table 3, which highlights the research context, methodology, and main contributions of each study included in this systematic literature review.

Table 3. Summary of the Included Studies

No.	Author(s), Year	Study Context and Sample	Methodology	Key Findings
A1	Zraydi et al. (2026)	244 public and private school teachers (special and inclusive education), Abu Dhabi, UAE	Quantitative survey; questionnaire; SPSS analysis	Teachers demonstrated positive intentions towards AI adoption. Social influence was identified as the strongest factor affecting AI acceptance.
A2	Alnaim and Al-Otaibi (2025)	108 special education teachers teaching students with learning disabilities, Dammam, Saudi Arabia	Quantitative descriptive-analytical survey; questionnaire; SPSS analysis	AI utilisation was at a moderate level. Limited training and technological infrastructure were identified as major barriers.
A3	Shaheen and Zanoon (2025)	351 special education teachers from public and private sectors, Amman, Jordan	Cross-sectional quantitative survey; questionnaire; SPSS analysis	Teachers demonstrated positive perceptions of AI in improving student engagement, personalised learning, and communication support.
A4	Şat et al. (2026)	8 special education teacher candidates at undergraduate level	Qualitative phenomenological study; semi-structured interviews; content analysis	Teacher candidates perceived AI as useful for instructional material preparation and personalised learning but emphasised the need for training and ethical awareness.
A5	Almarzouq et al. (2025)	96 special education teachers, Hawalli, Kuwait	Quantitative descriptive-analytical survey; questionnaire; SPSS analysis	Teachers perceived AI as important in Special Education; however, actual use remained limited due to insufficient training and facilities.
A6	Fteiha et al. (2025)	161 general and special education teachers (K–12), UAE	Quantitative cross-sectional survey; questionnaire; structural equation modelling	Positive attitudes towards AI were the strongest predictor of classroom AI practices, while knowledge influenced adoption indirectly through attitudes.

A7	Alshehri (2025)	443 special education teachers working with students with intellectual disabilities, Saudi Arabia	Quantitative descriptive survey; structured questionnaire; SPSS analysis	Teachers demonstrated positive technological competency and attitudes, although professional training participation remained limited.
A8	Alqarni (2026)	268 teachers supporting students with learning disabilities, Najran, Saudi Arabia	Quantitative descriptive survey; structured questionnaire; SPSS analysis	Teachers showed moderate perceptions of GenAI effectiveness and willingness to use AI but raised concerns regarding dependency and unclear policies.
A9	Mohamad Nizam Adhaa et al. (2025)	23 participants including special education teachers, administrators, parents, and educational IT experts from five schools	Qualitative action research; interviews, observations, document analysis, and focus groups	AI enhanced student engagement, but effective implementation depended on teacher training and school infrastructure readiness.
A10	Majid and Abdul Majid (2022)	60 secondary special education teachers, Johor Bahru, Malaysia	Quantitative survey; questionnaire; SPSS analysis	Teachers' readiness in knowledge and skills was at a moderate level, with a strong relationship between both aspects.
A11	Chanthiran et al. (2025)	10 primary special education teachers, Penang, Malaysia	Qualitative phenomenological study; semi-structured interviews; thematic analysis	Teachers acknowledged AI benefits in personalised learning and accessibility, but training limitations, institutional support, and ethical concerns affected adoption.
A12	Altakhaineh et al. (2026)	80 participants including teachers, special education experts, and parents from Jordan and UAE	Mixed-method study; questionnaires and focus groups; statistical and thematic analysis	AI was perceived as beneficial for inclusive education; however, effective implementation required training, infrastructure, and data privacy protection.
A13	Supermaniam and Muniandy (2025)	3 special education teachers supporting students with hearing impairments, Malaysia	Qualitative case study; semi-structured interviews; thematic analysis	Teacher readiness, institutional support, and professional training were identified as key factors affecting assistive technology adoption.
A14	Basaruddin and Mustafa (2025)	54 primary special education teachers, Malaysia	Quasi-experimental study; questionnaire, interviews, and reflective journals	AI improved teaching material analysis, reduced teacher workload, and supported inclusive material development, but required adequate training and policy support.

Data Analysis

The selected studies were analysed using thematic analysis based on the framework proposed by Braun and Clarke (2006). This analytical approach was selected because it provides a systematic procedure for identifying, organising, and interpreting patterns across multiple studies. In this systematic literature review, thematic analysis enabled the synthesis of empirical findings from different research contexts and methodologies to develop a comprehensive understanding of teachers' readiness to adopt AI in Special Education.

The analysis process involved several stages, beginning with repeated reading of the selected articles to achieve familiarity with the extracted findings. Relevant information related to teachers' readiness, knowledge, skills, attitudes, technology acceptance, influencing factors, and challenges associated with AI integration was identified and coded systematically. The generated codes were subsequently compared and grouped into broader categories based on similarities, relationships, and recurring patterns across the selected studies.

The refinement process resulted in the development of three major themes that represent the central findings of this systematic literature review:

Theme 1: Teachers' Readiness Towards AI Adoption in Special Education

This theme examines teachers' perceptions, acceptance, confidence, knowledge, and willingness to adopt AI technologies in Special Education settings.

Theme 2: Factors Influencing Teachers' Readiness Towards AI Integration

This theme focuses on factors that shape teachers' readiness, including professional training, digital literacy, technological experience, organisational support, infrastructure availability, and policy-related factors.

Theme 3: Challenges in AI Implementation in Special Education

This theme highlights barriers affecting AI adoption, including limited training opportunities, insufficient technological facilities, ethical concerns, privacy issues, and uncertainty regarding AI implementation.

These themes were developed based on recurring evidence identified across the 14 selected studies and subsequently guided the organisation and presentation of findings in the Results section.

RESULTS

This section presents the findings derived from the analysis of 14 articles that fulfilled the inclusion criteria of this systematic literature review. The findings are organised according to specific themes to address the research objectives and questions established in this study. The findings are subsequently critically analysed by relating them to previous studies and relevant theoretical perspectives. A comprehensive synthesis is also presented to summarise the emerging patterns and identify research gaps that require further attention in future studies.

Theme 1: Teachers' Readiness Towards AI Adoption in Special Education

The synthesis of the fourteen selected studies indicates that teachers' readiness towards AI adoption in Special Education generally ranges from moderate to high. Across different educational contexts, teachers consistently acknowledged AI as an emerging educational innovation capable of enhancing teaching quality and improving learning experiences for students with SEN. Rather than demonstrating resistance towards technological change, most teachers expressed openness to incorporating AI into instructional practice. This pattern reflects an encouraging level of preparedness for AI adoption within Special Education.

One of the most consistent findings concerns teachers' positive perceptions of AI. The reviewed studies demonstrate that teachers recognise AI as a valuable instructional resource that can improve teaching efficiency, support classroom management, and facilitate more responsive learning experiences. Positive attitudes were reported across studies conducted in different countries despite variations in participants' backgrounds and educational settings, suggesting that teachers increasingly view AI as an important component of future educational practice. Such perceptions provide favourable conditions for expanding AI integration within Special Education.

The educational value of AI also emerged prominently throughout the reviewed literature. Teachers acknowledged that AI could assist in lesson planning, instructional material development, assessment, and the delivery of timely feedback. Several studies further reported that AI reduced teachers' workload by streamlining routine instructional tasks while allowing greater attention to individual student needs. These practical advantages reinforce teachers' confidence in AI as a tool that complements, rather than replaces, professional teaching practice.

Another notable pattern identified across the reviewed studies relates to AI's capacity to support inclusive and personalised learning. Teachers consistently recognised that AI applications—including adaptive learning

platforms, intelligent tutoring systems, generative AI, and assistive technologies—enable instructional adjustments according to students' diverse learning profiles. Such flexibility was viewed as particularly valuable in Special Education, where students with SEN often require differentiated instruction, individualised learning pathways, and continuous educational support. The reviewed evidence therefore suggests that teachers increasingly associate AI with more inclusive and learner-centred educational practices.

Despite these encouraging findings, the synthesis also reveals that teachers' readiness should not be interpreted as a single construct. Several studies distinguished between teachers' positive attitudes towards AI and their actual capability to implement AI effectively during classroom instruction. While acceptance and perceived usefulness were consistently reported at relatively high levels, technological knowledge, pedagogical competence, and practical implementation skills remained comparatively less developed. This imbalance illustrates that readiness extends beyond favourable perceptions and encompasses multiple dimensions that collectively determine teachers' preparedness for AI integration.

A further observation emerging from the literature concerns the variation in readiness across different teacher characteristics. Several studies reported that teaching experience, academic qualifications, previous exposure to educational technologies, and digital competence influenced teachers' confidence in adopting AI. Within the Malaysian context, however, empirical evidence specifically examining AI readiness among Special Education teachers remains limited. Existing local studies nevertheless suggest that teachers possess moderate levels of digital competence, providing an important starting point for developing more specialised AI-related knowledge and skills through continuous professional learning.

Overall, the reviewed studies portray teachers' readiness towards AI adoption in Special Education as promising but still developing. Teachers generally recognise the educational benefits of AI and demonstrate a willingness to incorporate it into teaching and learning. Nevertheless, the literature consistently indicates that sustainable AI integration depends on strengthening teachers' technological competence, pedagogical expertise, and implementation capability alongside their positive attitudes. These findings establish teachers' readiness as the starting point for understanding the broader factors that influence AI adoption in Special Education, which are examined in the following theme.

Table 4. Thematic Analysis of Teachers' Readiness Towards AI Adoption in Special Education

Key Finding	Summary of Evidence	Supporting Studies
Positive attitudes towards AI	Teachers consistently demonstrated positive perceptions and recognised AI as a valuable instructional resource in Special Education.	A1, A2, A3, A4, A5, A6, A7, A8, A11, A12, A14
Perceived educational benefits	AI was perceived to improve personalised learning, instructional effectiveness, learning accessibility, and student engagement.	A1, A2, A3, A4, A5, A8, A9, A11, A12, A14
Moderate to high readiness	Most studies reported moderate to high levels of teachers' readiness towards AI adoption.	A1, A2, A3, A5, A6, A7, A8, A10, A11, A12, A14
Readiness as a multidimensional construct	Teachers demonstrated stronger readiness in attitudes than in technological competence and practical implementation.	A2, A5, A6, A7, A8, A10, A11, A14
Gap between acceptance and implementation	Positive perceptions were not consistently translated into classroom practice because of limited competence and implementation confidence.	A2, A5, A6, A11, A14
Influence of demographic and professional characteristics	Teachers' readiness varied according to teaching experience, academic qualifications, age, and professional background.	A3, A6, A7

Theme 2: Factors Influencing Teachers' Readiness Towards AI Adoption and Integration in Special Education

The reviewed studies consistently demonstrate that teachers' readiness towards AI adoption in Special Education is influenced by a combination of personal, institutional, and system-level factors. Rather than being determined by a single variable, readiness develops through the interaction of teachers' competencies, the support available

within schools, and the broader educational environment in which AI is introduced. This multidimensional perspective suggests that strengthening one factor alone is insufficient to ensure successful AI integration.

Across the reviewed literature, teachers' professional competence emerged as the most influential factor shaping readiness. Digital literacy, technological competence, self-efficacy, and previous experience with educational technologies were consistently associated with higher levels of confidence in adopting AI. Teachers who possessed stronger technological backgrounds were generally more willing to experiment with AI applications and demonstrated greater confidence in incorporating AI into teaching and learning. These findings indicate that professional competence provides the foundation upon which AI readiness is developed.

Professional learning was identified as a recurring catalyst for strengthening teachers' readiness. Several studies reported that structured AI-related training programmes improved teachers' technological knowledge while simultaneously enhancing their understanding of AI-supported pedagogy. Continuous professional development also enabled teachers to evaluate emerging AI tools more critically and adapt them to classroom instruction. This suggests that sustained learning opportunities are essential for transforming technological awareness into practical instructional competence.

Beyond teachers' individual capabilities, school environments play an equally important role in facilitating AI adoption. The reviewed studies highlight that instructional leadership, collaborative school cultures, peer support, and PLC participation encourage teachers to explore AI with greater confidence. Schools that provide technical assistance and create opportunities for professional collaboration tend to report stronger implementation practices than schools where teachers work in relative isolation. These findings illustrate that organisational support strengthens teachers' readiness by creating conditions that encourage experimentation and continuous learning.

The availability of technological resources further shapes teachers' ability to integrate AI into classroom practice. Reliable internet connectivity, appropriate digital devices, software accessibility, and ongoing technical support were repeatedly identified as enabling conditions for successful implementation. Conversely, limited infrastructure often constrained teachers' opportunities to utilise AI despite their willingness to adopt the technology. The reviewed evidence therefore suggests that teachers' readiness should be interpreted alongside institutional technological readiness rather than as an entirely individual characteristic.

Another important factor emerging from the reviewed studies concerns the role of educational systems in supporting AI integration. Clear implementation policies, ethical guidelines, and long-term capacity-building initiatives provide teachers with greater confidence when adopting AI in educational settings. Several studies also highlighted the importance of addressing issues related to data privacy, student confidentiality, and responsible AI use, particularly in Special Education, where learner information is often highly sensitive. Such system-level support reduces uncertainty while promoting more consistent and responsible AI implementation across schools.

Unlike many studies examining AI adoption in mainstream education, the reviewed literature consistently emphasises that teachers' readiness in Special Education also depends on their ability to adapt AI to the diverse characteristics of students with SEN. Teachers are expected not only to operate AI applications but also to evaluate their suitability, modify instructional approaches, and ensure that AI supports individual learning needs. This specialised pedagogical competence distinguishes AI integration in Special Education from technology adoption in more general educational contexts.

Rather than acting independently, the factors identified across the reviewed studies interact to shape teachers' overall readiness towards AI adoption. Individual competence enables teachers to use AI confidently, organisational support creates favourable implementation conditions, and educational systems provide the policy and governance structures necessary for sustainable practice. Together, these dimensions explain why teachers with similar attitudes towards AI may demonstrate different levels of implementation readiness. This integrated understanding provides an important context for interpreting the challenges that continue to influence AI implementation in Special Education, which are discussed in the following theme.

Table 5. Thematic Analysis of Factors Influencing Teachers' Readiness Towards AI Adoption and Integration in Special Education

Key Factor	Summary of Evidence	Supporting Studies
Professional training and development	Continuous AI-related professional development strengthens teachers' confidence, knowledge, and instructional readiness.	A3, A5, A6, A7, A8, A10, A11, A12, A13, A14
Digital literacy and technological competence	Teachers with stronger digital competence demonstrate greater readiness to integrate AI into teaching.	A2, A5, A6, A7, A10, A11, A14
Self-efficacy and positive attitudes	Confidence in using AI encourages teachers to adopt innovative instructional practices.	A1, A3, A5, A6, A8, A11
Previous experience with educational technologies	Prior experience with digital technologies facilitates teachers' acceptance and implementation of AI.	A5, A6, A7, A14
School leadership and organisational support	Administrative leadership, collaborative cultures, and technical support promote sustainable AI adoption.	A5, A9, A11, A12, A13, A14
Digital infrastructure and accessibility	Reliable internet access, digital devices, and software availability facilitate AI integration.	A2, A5, A6, A7, A8, A9, A11, A12, A14
Educational policies and ethical governance	Clear policies, ethical guidelines, and governance frameworks strengthen teachers' readiness and confidence.	A4, A8, A11, A12
AI adaptation to students' diverse needs	Teachers' ability to adapt AI according to individual learning characteristics is essential for inclusive implementation.	A2, A4, A8, A11, A12

Theme 3: Challenges in AI Adoption and Implementation in Special Education

Although the reviewed studies consistently acknowledge the educational potential of AI, they also reveal that its adoption in Special Education continues to be constrained by a range of interconnected challenges. These challenges extend beyond teachers' individual readiness and encompass institutional, technological, pedagogical, and policy-related issues. Rather than representing isolated barriers, the reviewed evidence suggests that these challenges collectively influence teachers' ability to integrate AI effectively into classroom practice. This indicates that successful AI implementation requires comprehensive support across multiple dimensions of the education system.

A major challenge identified across the reviewed literature concerns teachers' professional preparedness for AI integration. Despite generally positive attitudes towards AI, many teachers reported limited confidence in selecting appropriate AI applications, adapting them to different instructional contexts, and integrating them into everyday teaching practices. The reviewed studies consistently associated these difficulties with limited AI-specific training, uneven levels of digital literacy, and insufficient opportunities for hands-on professional learning. As AI technologies continue to evolve rapidly, maintaining teachers' knowledge and instructional competence remains an ongoing challenge rather than a one-time professional development effort.

The reviewed evidence further demonstrates that teachers' professional competence alone is insufficient without adequate institutional support. Several studies reported that unreliable internet connectivity, limited access to digital devices, insufficient technical assistance, and inadequate technological infrastructure continue to restrict AI implementation in schools. These limitations are particularly evident in resource-constrained educational settings, where technological inequalities may reduce opportunities for students with SEN to benefit from AI-supported learning. Consequently, successful AI integration depends not only on teacher readiness but also on schools' capacity to provide the technological environment necessary for sustained implementation.

Beyond institutional constraints, governance and ethical considerations represent another significant challenge. The reviewed studies consistently highlight teachers' concerns regarding data privacy, student confidentiality, algorithm reliability, and the responsible use of AI in educational settings. These concerns become particularly

important in Special Education, where AI applications frequently process sensitive learner information related to students' cognitive, behavioural, and developmental characteristics. In addition, several studies reported that unclear implementation policies and limited institutional guidance contribute to teachers' uncertainty regarding appropriate AI use. These findings suggest that responsible AI integration requires clear governance frameworks alongside technological innovation.

Another challenge emerging from the literature relates to the contextual suitability of AI applications for students with SEN. Unlike mainstream educational environments, Special Education requires teaching approaches that are highly individualised and responsive to diverse learning characteristics. The reviewed studies indicate that many existing AI applications have been developed primarily for general educational contexts and therefore require considerable adaptation before they can effectively support students with SEN. This places additional professional demands on teachers, who must evaluate the appropriateness of AI tools while ensuring that technology enhances, rather than limits, inclusive learning opportunities.

Taken together, the reviewed studies demonstrate that the challenges associated with AI implementation are multidimensional and closely interconnected. Limitations in teachers' professional competence, technological infrastructure, institutional support, policy guidance, ethical governance, and the contextual suitability of AI collectively influence the extent to which AI can be implemented successfully in Special Education. Addressing these challenges therefore requires coordinated action involving teachers, schools, policymakers, and technology developers to ensure that AI contributes meaningfully to inclusive educational practice rather than functioning merely as an emerging technological innovation.

Table 6. Thematic Analysis of Challenges in AI Adoption and Implementation in Special Education

Key Challenge	Summary of Evidence	Supporting Studies
AI-related professional training	Teachers require continuous AI-focused professional development to strengthen knowledge, pedagogical competence, and implementation confidence.	A1, A2, A3, A4, A5, A6, A7, A8, A9, A11, A12, A13, A14
AI competency and digital literacy	Differences in AI competency and digital literacy continue to influence teachers' readiness for classroom implementation.	A1, A2, A3, A4, A5, A6, A7, A8, A10, A11, A12, A13, A14
Digital infrastructure and technological resources	Limited internet access, digital devices, and technical support restrict AI implementation in schools.	A2, A5, A7, A8, A9, A11, A12, A14
Institutional support and implementation policies	Limited organisational support and unclear implementation guidelines reduce teachers' confidence in AI adoption.	A1, A2, A4, A5, A7, A8, A9, A11, A12, A13
Ethics, privacy, and data protection	Concerns regarding privacy, confidentiality, ethical AI use, and student data security remain significant implementation barriers.	A3, A4, A5, A8, A11, A12
Contextual suitability of AI for students with SEN	Existing AI applications often require adaptation to accommodate the diverse learning needs of students with SEN.	A2, A4, A8, A11, A12

DISCUSSION

Teachers' Readiness to Integrate AI in Special Education

The findings of this review indicate that Special Education teachers generally demonstrate moderate to high readiness towards AI adoption. Across the reviewed studies, teachers consistently expressed positive perceptions of AI and recognised its potential to improve differentiated instruction, enhance accessibility, and support inclusive learning for students with SEN. AI applications, including assistive technologies, speech recognition, and adaptive learning systems, were widely perceived as valuable tools capable of addressing diverse learning needs while reducing traditional barriers to participation. These findings suggest that teachers increasingly view

AI not merely as an emerging technology but as an educational resource capable of transforming inclusive teaching practices.

From a theoretical perspective, these findings provide strong support for the TAM, particularly the construct of perceived usefulness. Teachers' confidence in AI largely reflects their belief that the technology can improve instructional quality, simplify professional tasks, and provide more personalised learning experiences for students with SEN. This interpretation is also consistent with the global guidance published by UNESCO (2023; 2024), which recognises AI as an important pedagogical tool for improving educational accessibility and inclusion. Within the Malaysian context, these findings further reinforce the aspirations of the Digital Education Policy (2023) and the RPM 2026–2035, both of which advocate the meaningful integration of digital technologies to strengthen inclusive education.

The review further demonstrates that teachers' readiness should not be interpreted solely in terms of technological competence. Rather, teachers' professional belief that AI can improve learning opportunities for students with SEN appears to be equally influential. The reviewed studies consistently highlight AI's capacity to support adaptive learning, provide immediate feedback, and facilitate differentiated instruction according to individual learner needs. From the perspective of the TAM, these findings further strengthen the role of perceived usefulness in shaping teachers' behavioural intention to adopt AI. Consequently, readiness extends beyond technical proficiency and reflects teachers' confidence that AI can contribute meaningfully to equitable and high-quality educational provision.

Despite these encouraging findings, the reviewed evidence consistently reveals that teachers' readiness remains uneven across different dimensions. While positive attitudes towards AI are widely reported, technological knowledge and practical implementation skills continue to develop at a slower pace. Previous studies similarly indicate that teachers' psychological readiness often exceeds their ability to integrate AI effectively into classroom practice. From the perspective of the TAM, this imbalance suggests that perceived usefulness alone is insufficient to sustain technology adoption when perceived ease of use is constrained by limited technical competence. Teachers' readiness should therefore be understood as the interaction of positive attitudes, technological knowledge, and specialised pedagogical capability rather than as a single measure of technology acceptance.

Another important observation concerns the influence of teachers' professional characteristics on AI readiness. The reviewed studies indicate that demographic characteristics, academic qualifications, teaching experience, and previous exposure to educational technologies contribute to variations in teachers' confidence towards AI adoption. Teachers with broader experience in inclusive classrooms generally demonstrate greater openness towards AI and are more likely to recognise the value of intelligent assistive technologies in supporting students with SEN. These findings suggest that teachers' readiness should be interpreted within the context of their professional backgrounds rather than being viewed as a uniform characteristic across the teaching workforce.

Within the Malaysian context, empirical evidence specifically examining AI readiness among Special Education teachers remains limited. Nevertheless, existing local studies indicate that teachers generally possess moderate levels of digital knowledge and technological competence, providing an encouraging foundation for future AI integration. Given that AI requires more advanced competencies than general digital literacy, greater investment in professional development is required through the collaborative efforts of the Ministry of Education, teacher education institutions, and schools. Such initiatives are closely aligned with the strategic priorities outlined in the RPM 2026–2035, which seeks to develop a highly competent digital teaching workforce capable of responding to future educational challenges.

The synthesis also highlights an important implication for Malaysia's ongoing digital education agenda. Although teachers generally demonstrate favourable perceptions towards AI, the gap between conceptual acceptance and practical implementation indicates that digital transformation requires more than technology acceptance alone. Sustainable implementation depends upon continuous professional learning, opportunities to strengthen instructional competence, and supportive educational environments that enable teachers to translate positive perceptions into effective classroom practice. This perspective reflects the broader objectives of both

the Digital Education Policy (2023) and the RPM 2026–2035, which emphasise meaningful technology integration as a catalyst for improving the quality of inclusive education.

Overall, the reviewed evidence confirms that Special Education teachers demonstrate encouraging levels of readiness towards AI adoption, with readiness generally ranging from moderate to high. Viewed through the lens of the TAM, teachers' acceptance of AI continues to be influenced by both perceived usefulness and perceived ease of use. Nevertheless, sustaining AI implementation requires more than positive perceptions alone; it depends on strengthening professional competence, continuous training, organisational support, digital infrastructure, and ethical governance. Collectively, these findings establish teachers' readiness as the conceptual foundation for understanding the broader factors that influence AI adoption in Special Education, which are explored in the following section.

Factors Influencing Teachers' Readiness Towards AI Adoption and Integration in Special Education

The findings of this review demonstrate that teachers' readiness towards AI adoption in Special Education is shaped by the interaction of individual, organisational, and system-level factors rather than by technological competence alone. This multidimensional perspective is consistent with the TAM, which explains that technology acceptance is influenced by both internal beliefs and external conditions that shape users' perceptions of usefulness and ease of use. In the context of Special Education, effective AI integration therefore requires not only technological knowledge but also specialised pedagogical competence and a supportive educational ecosystem capable of translating teachers' positive perceptions into meaningful instructional practice.

Among the factors identified, professional learning and competency development emerged as the strongest determinants of teachers' readiness. The reviewed studies consistently indicate that structured AI-related training enhances teachers' technological competence, strengthens self-efficacy, and improves their confidence in integrating AI into classroom instruction. Beyond developing technical knowledge, continuous professional learning enables teachers to understand the pedagogical value of AI and to apply it more effectively when supporting students with SEN. These findings are consistent with previous studies reporting that professional development positively influences teachers' behavioural intention, confidence, and AI literacy. From a Malaysian perspective, this evidence reinforces the aspirations of the Digital Education Policy (2023) and the RPM 2026–2035, both of which emphasise continuous professional capacity building as a key strategy for developing digitally competent and future-ready educators.

The synthesis further reveals that teachers' digital literacy, technological competence, and prior experience with educational technologies substantially influence their readiness to adopt AI. Teachers who possess stronger digital competencies are generally more willing to explore AI applications, evaluate their instructional value, and integrate them into classroom practice. At the same time, previous experience with digital learning platforms and assistive technologies reduces technological anxiety while increasing teachers' confidence in adopting more advanced AI tools. These findings support the TAM, whereby greater familiarity with technology strengthens teachers' perceptions of ease of use and encourages more favourable attitudes towards innovation. They also reflect the priorities outlined in the Digital Education Policy (2023), which identifies digital competence as a fundamental professional capability required to support effective technology-enhanced teaching and learning.

Beyond individual competence, organisational conditions play an equally important role in strengthening teachers' readiness towards AI integration. The reviewed studies consistently demonstrate that school leadership, institutional support, collaborative professional cultures, and active PLCs encourage teachers to adopt AI with greater confidence. Schools that provide continuous technical assistance, opportunities for professional collaboration, and reliable technological infrastructure create environments where teachers are more willing to experiment with AI-supported instructional practices. Nevertheless, the evidence also indicates that adequate infrastructure alone is insufficient unless accompanied by sustained professional support that enables teachers to use available technologies effectively. This observation aligns closely with the strategic direction of the Digital Education Policy (2023) and the RPM 2026–2035, both of which recognise school leadership, sustainable digital infrastructure, and institutional support as essential components of national digital transformation in education.

At the educational system level, the reviewed studies highlight the importance of coherent policies, ethical governance, and clear implementation guidelines in shaping teachers' confidence towards AI adoption. The availability of well-defined policies reduces uncertainty surrounding professional responsibilities while promoting more responsible and consistent AI implementation across schools. Equally important are issues relating to data privacy, student confidentiality, and ethical decision-making, particularly in Special Education, where AI applications frequently involve sensitive learner information. These findings reinforce the need for governance frameworks that support teachers while safeguarding students' rights and wellbeing. Within the Malaysian context, this discussion is closely aligned with the objectives of the Digital Education Policy (2023) and the RPM 2026–2035, both of which advocate ethical, secure, and responsible technology integration as a foundation for sustainable educational innovation.

A distinctive finding emerging from this review concerns the need for teachers to adapt AI according to the diverse learning characteristics of students with SEN. Unlike mainstream educational settings, effective AI implementation in Special Education requires teachers to evaluate, modify, and personalise AI applications based on students' cognitive abilities, communication needs, behavioural profiles, and individual learning goals. Consequently, teachers' readiness cannot be measured solely by their technological competence but must also reflect their ability to integrate AI within inclusive pedagogical practices. This perspective is consistent with the broader aspirations of the Education Act 1996 (Act 550) and the RPM 2026–2035, both of which emphasise equitable access to high-quality education and the provision of appropriate educational support for students with diverse learning needs.

Taken together, the reviewed evidence demonstrates that teachers' readiness towards AI adoption is best understood as a multidimensional construct shaped by the interaction of professional competence, organisational capacity, and educational system support. Strengthening teachers' readiness therefore requires coordinated efforts that extend beyond technical training to include supportive school leadership, sustainable digital infrastructure, ethical governance, and continuous professional learning. In the Malaysian context, these findings strongly reinforce the strategic priorities outlined in the Digital Education Policy (2023) and the RPM 2026–2035, highlighting the need for collaborative partnerships among teachers, school leaders, teacher education institutions, and policymakers to ensure that AI contributes meaningfully to inclusive education for students with SEN.

Challenges in AI Adoption and Implementation in Special Education

The findings of this review indicate that, despite the considerable educational potential of AI, its successful implementation in Special Education remains dependent on the readiness of the broader education system to support digital transformation. The reviewed studies consistently demonstrate that AI integration involves more than the introduction of new technologies; it requires corresponding changes in pedagogical practices, school culture, and institutional capacity to respond to rapidly evolving digital innovations. Within Special Education, these challenges become even more complex because AI applications must accommodate the diverse, flexible, and individualised learning needs of students with SEN. This perspective aligns closely with the strategic direction of Malaysia's National Education Plan (RPN/RPM 2026–2035), which advocates inclusive digital transformation to strengthen learner-centred education.

Among the challenges identified, teachers' professional competence remains one of the most significant barriers to effective AI implementation. Although teachers generally demonstrate positive attitudes towards AI, many continue to experience difficulties in selecting appropriate AI applications, adapting them to diverse learner needs, and integrating them into authentic classroom practice. The reviewed evidence suggests that the challenge extends beyond operating AI technologies to making sound pedagogical decisions regarding when, why, and how AI should be used to enhance learning outcomes for students with SEN. As highlighted by previous studies, teachers increasingly function not only as technology users but also as instructional designers who continuously evaluate the educational value of AI within inclusive learning environments. These findings reinforce the importance of sustained pedagogical support, mentoring, and professional collaboration to strengthen teachers' instructional confidence.

The review further demonstrates that insufficient AI-specific training continues to constrain teachers' ability to implement AI effectively. Unlike teachers in mainstream education, Special Education teachers must evaluate AI applications against a wider range of learner characteristics, including cognitive ability, communication skills, behavioural needs, and adaptive functioning. Without adequate professional preparation, teachers may struggle to determine the suitability of AI tools for different educational contexts, thereby limiting the effectiveness of technology-enhanced interventions. Previous studies similarly report that digital competence represents a prerequisite for successful AI adoption. From the Malaysian perspective, these findings reinforce the aspirations of the Digital Education Policy (2023), which identifies continuous professional development as a key strategy for developing digitally competent teachers capable of supporting inclusive education.

Institutional readiness also emerged as a major challenge influencing AI implementation. The reviewed studies consistently identify unequal access to digital infrastructure, limited technological resources, and disparities in institutional capacity as barriers that continue to restrict AI adoption across schools. Such limitations not only reduce teachers' opportunities to integrate AI into classroom practice but also create inequalities in learning opportunities for students with SEN. Learners in schools with inadequate digital facilities may be deprived of interactive, adaptive, and personalised learning experiences that are increasingly available in better-resourced educational settings. These findings suggest that digital infrastructure should be viewed not merely as a technological investment but as an essential component of educational equity. This interpretation is consistent with both the Digital Education Policy (2023) and the RPN/RPM 2026–2035, which identify sustainable digital infrastructure as a critical foundation for inclusive educational transformation.

Beyond infrastructure, the reviewed studies emphasise the importance of governance, policy, and ethical regulation in supporting responsible AI implementation. Effective AI integration requires clear policy frameworks that define professional responsibilities while promoting collaboration among educational institutions, technology developers, policymakers, and other stakeholders. The literature further highlights growing concerns regarding data privacy, student confidentiality, and the reliability of AI-generated information, particularly in Special Education, where AI applications frequently process highly sensitive learner data. These findings demonstrate that technological innovation must be accompanied by transparent governance structures and ethical safeguards to ensure that AI enhances educational practice without compromising students' rights and wellbeing.

A distinctive challenge identified across the reviewed literature concerns the contextual suitability of AI applications for students with SEN. Unlike mainstream educational settings, Special Education requires instructional technologies that can accommodate highly diverse learning profiles and individual educational goals. Consequently, AI applications developed for general education may require substantial adaptation before they can effectively support students with different cognitive, behavioural, and communication needs. The review also suggests that many existing AI applications remain insufficiently responsive to local educational contexts, particularly regarding language, curriculum, culture, and the specific needs of Malaysian learners. These findings reinforce the importance of collaborative partnerships among educators, researchers, technology developers, government agencies, families, and communities to ensure that AI innovations remain educationally relevant and culturally appropriate. Such collaborative development reflects the broader aspirations of the RPN/RPM 2026–2035, which advocates educational innovation that responds to both national priorities and global technological developments.

Taken together, the reviewed evidence demonstrates that the challenges associated with AI integration in Special Education are multidimensional and mutually reinforcing. Teachers' competence, continuous professional learning, institutional capacity, digital infrastructure, governance, ethical regulation, and contextual adaptation collectively determine whether AI can be implemented effectively in inclusive educational settings. Positive teacher readiness alone is therefore insufficient to achieve meaningful digital transformation. Sustainable AI implementation requires coordinated action across schools, teacher education institutions, policymakers, and technology developers to ensure that AI contributes to equitable, high-quality education for students with SEN. Within the Malaysian context, this integrated approach is strongly aligned with the Digital Education Policy (2023) and the RPN/RPM 2026–2035, both of which position inclusive digital innovation as a strategic priority for the future development of Special Education.

IMPLICATIONS OF THE STUDY

Theoretical Implications

The findings of this systematic literature review provide important theoretical implications for the TAM. The synthesis of fourteen empirical studies indicates that Special Education teachers demonstrate positive acceptance towards AI, primarily due to their recognition of AI's potential in enhancing pedagogical effectiveness, facilitating instructional material development, and addressing the diverse learning needs of students with SEN. These findings strengthen the relevance of the perceived usefulness construct within TAM, which suggests that individuals are more likely to accept a technology when they perceive that the system can improve their performance and productivity.

Furthermore, the findings demonstrate that teachers' perceptions of AI accessibility and usability are positively associated with their willingness to integrate the technology into teaching practices. Teachers who perceive AI applications as manageable and easy to learn are more likely to demonstrate greater readiness towards AI adoption. This finding reinforces the theoretical importance of the perceived ease of use construct within TAM, which explains that users' perceptions regarding the simplicity and accessibility of technological systems influence their acceptance decisions.

However, the findings also reveal a gap between teachers' positive attitudes towards AI and their actual implementation practices. Although teachers demonstrate strong acceptance of AI, limitations related to technical skills, digital experience, and professional training continue to influence their ability to utilise AI effectively. Therefore, this study suggests that TAM should be considered alongside the concept of teacher technology readiness to provide a more comprehensive explanation of AI adoption in Special Education. Integrating these perspectives may provide a stronger theoretical framework by explaining the relationship between teachers' perceptions, technological competencies, and actual classroom practices.

Pedagogical Implications

From a pedagogical perspective, the findings highlight that successful AI integration in Special Education depends greatly on teachers' competencies and readiness to apply technology meaningfully in instructional practices. Therefore, systematic and continuous professional development programmes related to AI should be provided to equip teachers with the knowledge and skills required to utilise AI applications effectively. Such training should not only focus on technical operation but also emphasise practical applications, including AI-assisted instructional material development, personalised learning approaches, assistive technologies, and learning management strategies for students with SEN.

The effective utilisation of AI has the potential to expand pedagogical opportunities by enabling more personalised, adaptive, and inclusive learning experiences. Through the integration of AI-based assistive technologies, adaptive learning systems, and responsive feedback mechanisms, teachers can better address individual differences among students with SEN. Therefore, strengthening teachers' AI competencies is essential because teachers' ability to select, adapt, and apply AI technologies directly influences the quality of educational interventions and learning outcomes.

At the school level, educational institutions play an important role in facilitating AI adoption by providing supportive environments for teachers. Schools should ensure the availability of digital infrastructure, reliable internet connectivity, access to appropriate AI applications, and continuous technical assistance. Previous studies have demonstrated that organisational support significantly influences teachers' confidence and readiness towards AI implementation (Altakhaineh et al., 2026; Mohamad Nizam Adhaa et al., 2025). In addition, teacher education institutions should continuously update their training programmes to incorporate AI competencies, ensuring that future Special Education teachers are prepared to integrate emerging technologies into inclusive teaching practices.

Policy Implications

The findings indicate that AI adoption in Special Education requires strong support from educational policymakers rather than relying solely on individual teachers. The current limitations in AI implementation are associated with insufficient policy guidance, limited professional development opportunities, and inadequate systemic support. Previous research has demonstrated that clear institutional policies and structured support mechanisms contribute significantly to increasing teachers' confidence and willingness to adopt AI technologies (Aravantinos et al., 2026).

Therefore, the development of national guidelines for AI use in education should be prioritised to ensure that AI implementation occurs safely, ethically, and inclusively. These guidelines should address important aspects including ethical considerations, student data protection, information confidentiality, and digital security. UNESCO (2023) emphasised that AI integration in education must be implemented in a manner that promotes safety, fairness, and inclusiveness to ensure that technological benefits are accessible to all learners while minimising potential risks.

Within the Malaysian educational context, the findings further support the direction of national digital transformation efforts by highlighting that AI integration in Special Education should be viewed as a strategic necessity rather than merely an optional innovation. Future AI-related educational policies should adopt an inclusive approach by prioritising two key areas: ensuring that AI technologies are adapted according to the diverse needs of students with SEN and strengthening the digital competencies of Special Education teachers. Furthermore, investment in digital infrastructure, including internet accessibility, digital devices, and AI-based educational resources, remains essential to support effective implementation. This recommendation is consistent with Almarzouq et al. (2025), who reported that AI integration becomes more effective when schools possess adequate technological facilities. Similarly, Fteiha et al. (2025) highlighted that AI-related professional training has a direct relationship with teachers' readiness. Therefore, continuous AI-focused professional development should become an integral component of teacher development initiatives.

Limitations And Future Research Directions

This systematic literature review identifies several limitations that continue to influence the effective adoption and implementation of AI in Special Education. The most prominent limitation relates to the insufficient professional training and development opportunities available for teachers. The reviewed studies indicate that many teachers continue to demonstrate limited technical knowledge, pedagogical understanding, and confidence in integrating AI into teaching and learning practices. Furthermore, existing AI-related training programmes are often inconsistent, insufficiently structured, and provide limited emphasis on practical classroom applications, particularly in addressing the diverse needs of students with SEN.

Another significant limitation concerns technological infrastructure and digital accessibility within educational settings. The findings reveal that unstable internet connectivity, limited access to digital devices, and inadequate technical support remain barriers affecting the effective implementation of AI in schools. These challenges are particularly critical in Special Education, where unequal access to digital technologies may limit opportunities for students with SEN to benefit from personalised, adaptive, and inclusive learning experiences. Therefore, future implementation efforts should consider digital equity as an essential component of AI integration rather than merely a technological requirement.

The reviewed studies also highlight limitations related to AI governance, ethical considerations, and contextual relevance. The absence of clear guidelines regarding data privacy, student information protection, and ethical AI use may result in inconsistent implementation practices across educational settings. Furthermore, many existing AI applications are developed based on international contexts and may not fully address local cultural, linguistic, curricular, and educational requirements. Therefore, future research should focus on developing AI solutions that are more responsive to local Special Education contexts, particularly in supporting the diverse needs of students with SEN.

In addition, the current literature indicates that AI implementation in Special Education requires stronger collaboration among multiple stakeholders, including schools, policymakers, technology developers, parents, and communities. Limited cross-sector collaboration may restrict the sustainability and scalability of AI initiatives within educational systems. Future studies should therefore investigate collaborative implementation models that integrate technological expertise, educational practice, and policy support to establish a more comprehensive AI ecosystem for Special Education.

Future research should also consider conducting more empirical investigations involving larger and more diverse samples of Special Education teachers across different educational contexts. Longitudinal studies are recommended to examine how teachers' AI readiness develops over time following professional development interventions. In addition, future studies should explore the effectiveness of specific AI applications in improving learning outcomes, accessibility, and participation among students with SEN. Such research would contribute stronger empirical evidence regarding the practical value and sustainability of AI integration in Special Education.

CONCLUSION

This systematic literature review concludes that AI has significant potential to enhance the quality of teaching and learning in Special Education. The findings demonstrate that Special Education teachers generally possess positive perceptions towards AI and recognise its potential in supporting personalised learning, improving instructional effectiveness, and increasing accessibility for students with SEN. However, teachers' readiness to implement AI remains influenced by several factors, including technological knowledge, practical skills, professional confidence, and opportunities for meaningful application.

The findings further indicate that teachers' readiness towards AI adoption is shaped by multiple interconnected factors, including professional training, digital competency, technological infrastructure, organisational support, and educational policies. At the same time, several challenges continue to hinder effective AI implementation, including limited AI-related training, ethical and privacy concerns, unequal access to digital resources, and the lack of AI applications specifically designed according to the needs of Special Education learners. Therefore, successful AI integration requires a comprehensive approach involving teachers, schools, teacher education institutions, technology developers, and educational policymakers.

From a theoretical perspective, this study reinforces the relevance of the TAM by demonstrating that perceived usefulness and perceived ease of use influence teachers' willingness to adopt AI technologies. However, the synthesis also reveals a gap between technology acceptance and actual classroom implementation, suggesting that AI adoption requires additional consideration of teachers' competencies, experiences, and contextual support. Therefore, integrating TAM with the concept of teacher technology readiness may provide a more comprehensive framework for understanding AI adoption in Special Education.

Overall, the successful integration of AI in Special Education requires a sustainable ecosystem supported by competent teachers, supportive institutions, accessible digital infrastructure, and ethical governance frameworks. Strengthening teachers' AI competencies, expanding technological accessibility, enhancing institutional support, and establishing responsible AI policies are essential steps towards ensuring that AI functions as a meaningful catalyst for inclusive educational transformation. Through coordinated efforts among relevant stakeholders, AI has the potential to contribute towards the development of a more equitable, responsive, and future-ready Special Education system.

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