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Understanding Teachers' Acceptance and Use of AI in Secondary Inclusive Classrooms using the UTAUT Model

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Abstract

Despite substantial investments in educational technology, teacher adoption of artificial intelligence (AI) in classrooms remains disappointingly low, particularly in inclusive education contexts. This conceptual paper examines teacher acceptance of AI in secondary inclusive classrooms through the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. A narrative review of 13 empirical and conceptual studies (2016-2025) reveals four critical gaps: (i) absence of UTAUT-based research in inclusive secondary contexts (only 3 of 13 studies employed UTAUT, none in mainstream inclusive classrooms); (ii) insufficient focus on teacher acceptance as mediating factor, with most studies emphasizing technological affordances over adoption determinants; (iii) limited Malaysian empirical work despite national policy commitments to digital transformation and inclusive education; and (iv) unclear mechanisms linking acceptance to sustained usage in complex pedagogical environments. Analysis indicates Performance Expectancy and Facilitating Conditions consistently predict adoption across contexts, but validation in inclusive secondary settings remains absent. This paper consolidates fragmented literature, identifies critical theoretical and empirical gaps, and proposes UTAUT as a framework for future research. Findings have implications for policymakers designing AI integration strategies, school leaders creating supportive conditions, and teacher educators developing professional development programs for Malaysia's 2,117 secondary inclusive education teachers serving over 95,000 students with special needs.

Keywords: Artificial Intelligence, Inclusive Education, Secondary Schools, Teacher Acceptance, Utaut, Technology Adoption

Introduction

Despite billions invested globally in educational technology, a persistent paradox confronts education systems: while AI tools proliferate in schools, actual classroom adoption remains disappointingly low (Holmes et al., 2019; Zawacki-Richter et al., 2019). In Malaysia, the National Audit Report (2022) revealed that 62% of ICT equipment in schools is underutilized,

raising questions about factors determining whether technologies translate into pedagogical change. This disconnect is particularly acute in inclusive education, where 2,117 teachers in Malaysian secondary schools must integrate AI to support over 95,000 students with special needs (MOE, 2023) yet lack comprehensive frameworks guiding adoption.

AI offers compelling potential for inclusive classrooms through personalized learning, automated assessment, accessibility tools, and data-driven decision support (Holmes et al., 2019; Holmes & Luckin, 2016). For students with disabilities, AI-powered applications, including speech-to-text, adaptive platforms, and assistive technologies, can reduce learning barriers and enable more equitable access (Habib et al., 2022; Kumar, 2025). Systematic reviews of AI applications in special education confirm diverse interventions supporting students with varied needs (Hopcan et al., 2022). However, realizing this potential depends fundamentally on teachers as mediators whose beliefs, attitudes, and contextual constraints shape whether AI integrates into practice (Ertmer & Ottenbreit-Leftwich, 2010). Despite growing recognition of AI's promise, many teachers express concerns about reliability, ethical implications, privacy, bias, and practical usefulness (Akgun & Greenhow, 2022).

Understanding what drives teachers to adopt or reject AI tools requires a robust theoretical framework that can systematically examine the complex interplay of beliefs, attitudes, and contextual factors shaping technology acceptance. This study employs the Unified Theory of Acceptance and Use of Technology (UTAUT) as its conceptual framework to guide the analysis of teacher acceptance of AI in inclusive secondary classrooms. UTAUT serves as the theoretical lens for examining how four core constructs (Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions) shape teachers' behavioral intentions toward AI adoption. This framework was selected due to its robust predictive validity across diverse educational technology contexts, explaining up to 70% of variance in behavioral intention (Venkatesh et al., 2003), and its comprehensive integration of eight predecessor theories including the Technology Acceptance Model, Theory of Planned Behavior, and Innovation Diffusion Theory. By grounding the analysis within UTAUT, this review systematically examines whether and how these established acceptance determinants apply to the unique context of inclusive teaching, where pedagogical complexity, diverse learner needs, and ethical considerations may alter traditional patterns of technology adoption.

The UTAUT framework, developed by Venkatesh et al. (2003), identifies four core determinants of technology adoption: Performance Expectancy (PE) refers to beliefs about performance enhancement; Effort Expectancy (EE) refers to perceived ease of use; Social Influence (SI) refers to normative pressures from significant others; and Facilitating Conditions (FC) refers to organizational and technical support. The model has been widely applied in education to understand teacher technology adoption (Teo, 2011; Fathema et al., 2015), yet its application to AI adoption in inclusive secondary classrooms remains virtually unexplored.

However, UTAUT has rarely been employed to investigate teacher acceptance of AI specifically in inclusive secondary classrooms. Existing research emphasizes technological capabilities or general teacher perceptions without grounded frameworks (Zawacki-Richter et al., 2019). Studies employing UTAUT typically examine general education, higher

education, or specific student populations, leaving critical gaps in understanding how UTAUT constructs operate within inclusive teaching's unique demands (Watted, 2025; Baharin et al., 2025). Research on teacher technology adoption more broadly highlights that pedagogical beliefs, contextual factors, and organizational support significantly influence integration (Tondeur et al., 2017), yet these insights have not been systematically applied to AI adoption in inclusive contexts.

In Malaysia, despite substantial policy commitments to digital transformation (Digital Education Policy 2023-2030; RM2.4 billion investment in Budget 2024) and inclusive education (Malaysia Education Blueprint 2013-2025), empirical research examining teacher acceptance of AI in inclusive secondary classrooms is virtually nonexistent. Malaysian studies focus on conceptual discussions, higher education, TVET settings, or specific disabilities rather than mainstream inclusive teachers' realities (Melyza Lowa, 2024; Aniq et al., 2024; Sathianarayanan et al., 2025).

Given these gaps in both theoretical application and empirical evidence within Malaysian contexts, this conceptual paper addresses a critical need in the literature. This paper synthesizes literature on AI in education, AI for inclusive learning, and UTAUT framework application to consolidate fragmented knowledge, identify convergent patterns and critical research gaps, and propose theoretically grounded directions for future empirical investigation. Through systematic review of 13 recent studies, this paper establishes the foundation for UTAUT-informed research on teacher acceptance of AI in Malaysian secondary inclusive classrooms, with implications for policymakers, school leaders, and teacher educators seeking to support effective AI integration.

Methodology

This narrative review synthesized literature on AI adoption in inclusive education through database searches in Scopus, Web of Science, ERIC, and Google Scholar using keywords combining "artificial intelligence," "education," "inclusive education," "secondary schools," "UTAUT," and "teacher acceptance." Search terms targeted publications from 2016-2025 to capture recent AI developments while retaining seminal theoretical works (Venkatesh et al., 2003; Davis, 1989) and foundational AI in education literature (Holmes & Luckin, 2016).

From approximately 150 initially identified articles, 45 were retained after title and abstract screening. Following full-text review, 13 studies were selected based on relevance to: (i) AI applications in education or inclusive learning; (ii) teacher acceptance using UTAUT or related frameworks; (iii) technology adoption in inclusive, special, or secondary education; and (iv) Malaysian educational contexts. The sample includes diverse methodologies (quantitative surveys, systematic reviews, conceptual analyses, literature reviews) across multiple geographical settings (Malaysia, Israel, Nigeria, international). Each study was analyzed thematically using questions about theoretical framework, educational context, methodology, key findings, and identified gaps. Findings were synthesized narratively and organized in Table 1 to facilitate cross-study comparison and pattern identification.

Limitations include the non-exhaustive nature of narrative reviews, heterogeneity across study types and quality levels, focus on recent literature potentially overlooking earlier

foundational work, and language restrictions (English and Malay) potentially excluding relevant studies from non-Anglophone contexts.

Literature Review

Artificial Intelligence (AI) in Education

AI has emerged as influential technology transforming education worldwide (UNESCO, 2023; Holmes et al., 2019). AI enables personalized learning through adaptive algorithms tailoring instruction to individual performance (Kulik & Fletcher, 2016), automated assessment providing immediate feedback (Shute & Rahimi, 2017), and learning analytics supporting data-driven decision-making (Baker & Hawn, 2022). For students with disabilities, AI-powered assistive technologies, including text-to-speech, real-time captioning, and adaptive interfaces, reduce barriers and enhance accessibility (Habib et al., 2022; Kumar, 2025).

In Malaysia, national initiatives have prioritized digital transformation. The Malaysia Education Blueprint 2013-2025 established foundations for technology-enabled learning (MOE, 2013), while the Digital Education Policy 2023-2030 explicitly positions AI as strategic priority (MOE, 2023). The government allocated RM2.4 billion in Budget 2024 for educational digitalization (Ministry of Finance, 2023). However, AI integration remains early-stage, with teachers often lacking exposure, training, and confidence in AI-based tools (Aniq et al., 2024; Melyza Lowa, 2024).

AI in Inclusive Classrooms

AI introduces opportunities for supporting inclusive education, particularly for students with diverse learning needs and disabilities (Habib et al., 2022; Kumar, 2025). A systematic review by Hopcan et al. (2022) identified multiple AI applications supporting students with special needs, including adaptive learning systems, assistive technologies, and personalized interventions. Globally, AI tools support students with dyslexia through reading applications (Rello & Ballesteros, 2015), students with autism through social-emotional platforms (Bernardini et al., 2014; Khowaja et al., 2020), and students with ADHD through adaptive systems incorporating gamification (Weerdmeester et al., 2016). Beyond individual assistive technologies, AI enhances inclusive teaching by identifying at-risk students, generating insights about learning patterns, and recommending differentiated strategies (Baker & Hawn, 2022).

In Malaysian inclusive education, governed by PPKI and mainstream inclusion policies (MOE, 2013), over 95,000 students with special needs are enrolled in secondary schools supported by 2,117 teachers (MOE, 2023). Research on AI applications for Malaysian inclusive classrooms remains limited, focusing on conceptual discussions rather than empirical adoption studies (Sathianarayanan et al., 2025; Melyza Lowa, 2024). Barriers include limited tool access, insufficient training, privacy concerns, and uncertainty about alignment between AI and inclusive pedagogical values emphasizing human relationships (Holmes et al., 2021).

Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), synthesizes eight technology acceptance theories into a unified framework identifying four core determinants of adoption:

Performance Expectancy (PE): This refers to the extent to which individuals believe technology will enhance performance. In education, PE captures teachers' beliefs about whether AI improves effectiveness, learning outcomes, or efficiency (Teo, 2011). Research consistently identifies PE as strongest predictor across technologies and contexts (Fathema et al., 2015).

Effort Expectancy (EE): This refers to perceived ease of use. Teachers adopt tools perceived as intuitive and requiring minimal technical expertise (Teo, 2011). EE shows variable importance, sometimes diminishing as users gain experience (Venkatesh et al., 2003).

Social Influence (SI): This refers to the extent to which significant others (leaders, colleagues, authorities) believe individuals should use technology. SI proves particularly influential when use is mandated or highly visible (Venkatesh et al., 2003).

Facilitating Conditions (FC): This refers to availability of organizational and technical support, including infrastructure, training, and assistance (Fathema et al., 2015). FC often emerges critical in resource-constrained systems (MCMC, 2023).

UTAUT proposes these constructs influence Behavioral Intention (BI), predicting actual Use Behavior (UB). The model includes moderating variables (age, gender, experience, voluntariness), though educational research often adapts or excludes these when less relevant (Teo, 2011).

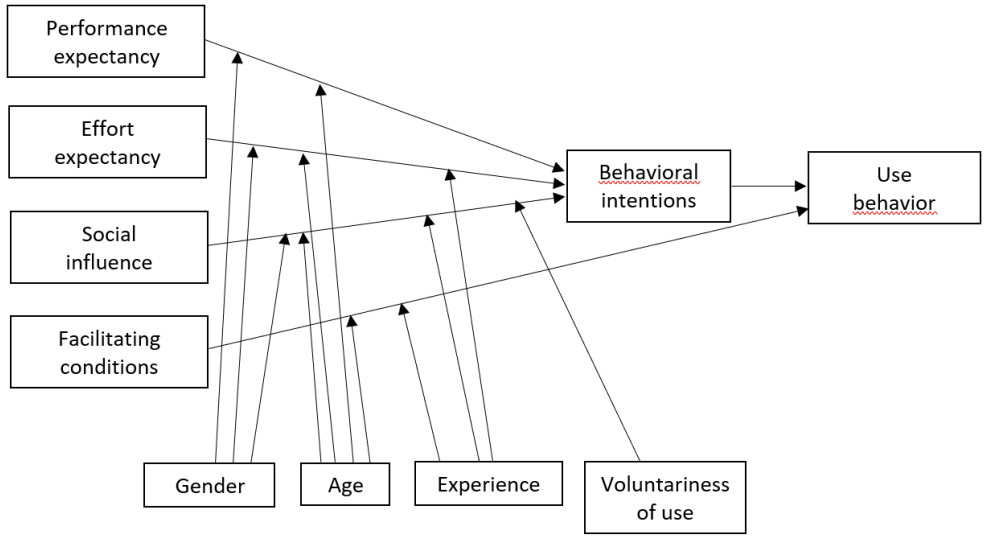

Figure 1: Unified Theory of Acceptance and Use of Technology Model (Venkatesh et al., 2003)

Recent studies applying UTAUT to AI adoption in education yield valuable insights. Watted (2025) found PE and SI strongly predicted Israeli teachers' intentions toward AI integration, while EE had weaker effects. Khan et al. (2023) found PE and FC significantly influenced Malaysian special education teachers' acceptance of technology for ASD students, whereas EE did not. Baharin et al. (2025) found all four constructs predicted Malaysian TVET students' generative AI adoption. These patterns suggest UTAUT provides robust foundation but requires context-specific validation, particularly in inclusive secondary settings where

pedagogical complexity, diverse needs, and workload pressures may alter construct importance.

Synthesis of Literature: Patterns, Trends, And Gaps

This section synthesizes 13 recent studies to identify patterns, trends, and critical gaps in literature on AI adoption in education, with particular attention to inclusive contexts and technology acceptance frameworks. Table 1 provides structured overview of these studies, organized by theoretical framework, educational context, methodology, and geographical setting.

Overview of Reviewed Studies

The 13 studies represent diverse approaches spanning conceptual papers, systematic reviews, quantitative surveys, and literature reviews. Geographically, studies include research from Malaysia (n=5), Israel (n=1), Nigeria (n=1), and international contexts (n=5). Methodologically, the distribution includes quantitative studies (n=3), systematic reviews (n=3), conceptual or review papers (n=5), and literature/case reviews (n=2). Theoretically, only three studies employed UTAUT or UTAUT2 frameworks (Watted, 2025; Khan et al., 2023; Baharin et al., 2025), while remaining studies adopted alternative theoretical lenses or presented atheoretical accounts.

Table 1
Summary of Reviewed Studies on AI in Education and Technology Acceptance

No	Title	Authors	Year	UTAUT	Secondary School	Data Analysis	Country
1	Innovative Teaching Methodologies in the Era of AI: A Review of Inclusive Practices	Adeleye et al.	2024	No	No	Literature Review	Nigeria
2	Teachers' Perceptions and Intentions Toward AI Integration in Education: UTAUT Model	Watted	2025	Yes (UTAUT)	No (general teachers)	Quantitative (Survey)	Israel
3	Revolutionizing Inclusion: AI in Adaptive Learning for Students with Disabilities	Habib et al.	2022	No	Yes (inclusive/ disabilities)	Literature Review	International
4	Evaluating the Effectiveness of AI in Facilitating Inclusive Education	Sathianarayanan et al.	2025	No	Yes (inclusive)	Conceptual / Review	Malaysia
5	Democratizing Access to Education: AI-Driven Solutions for Inclusive	Melyza Lowa	2024	No	Yes (inclusive)	Conceptual	Malaysia

	Learning in Malaysia						
6	Concept Paper: Efficiency of AI Tools for STEM Education in Malaysia	Aniq et al.	2024	No	No (STEM general)	Concept Paper	Malaysia
7	Teachers' Behavioral Intention and Acceptance of Technology-Based Intervention for ASD	Khan et al.	2023	Yes (UTAUT2)	Yes (special education/ASD)	Quantitative (Survey + PLS-SEM)	Malaysia
8	Adoption of Generative AI by TVET Students Using UTAUT	Baharin et al.	2025	Yes (UTAUT)	No (students / TVET)	Quantitative	Malaysia
9	AI and Inclusive Education: Opportunities and Challenges	Kumar	2025	No	Yes (inclusive)	Conceptual / Review	International
10	Artificial Intelligence in Special Education: A Systematic Review	Hopcan et al.	2022	No	Yes (special education)	Systematic Review	International
11	Understanding the Relationship Between Teachers' Pedagogical Beliefs and Technology Use	Tondeur et al.	2017	No	No (general)	Systematic Review of Qualitative Evidence	International
12	Systematic Review of Research on AI Applications in Higher Education	Zawacki-Richter et al.	2019	No	No (higher education)	Systematic Review	International
13	Intelligence Unleashed: An Argument for AI in Education	Holmes & Luckin	2016	No	No (general AI)	Conceptual / Book	International

Key Patterns and Trends

Analysis of the 13 studies reveals several notable patterns across theoretical frameworks, methodologies, educational contexts, and geographical settings.

Limited Application of UTAUT in Inclusive Secondary Contexts

As evident in Table 1, only 3 out of 13 studies (23%) employed UTAUT or UTAUT2 framework (Watted, 2025; Khan et al., 2023; Baharin et al., 2025). More critically, none of these UTAUT-based studies were conducted specifically in mainstream secondary inclusive classrooms where teachers work with heterogeneous groups of students with and without special needs.

Watted (2025) examined general teachers' perceptions toward AI integration in Israel, finding that Performance Expectancy and Social Influence strongly predicted behavioral intention

while Effort Expectancy had weaker effects. However, this study did not differentiate between mainstream and inclusive contexts, nor focus specifically on secondary education. Khan et al. (2023) investigated Malaysian special education teachers' acceptance of technology-based interventions for students with autism spectrum disorder using UTAUT2, finding that Performance Expectancy and Facilitating Conditions significantly influenced intention while Effort Expectancy did not. However, this study focused exclusively on teachers in specialized settings rather than inclusive classrooms serving diverse populations. Baharin et al. (2025) examined Malaysian TVET students' adoption of generative AI using UTAUT, finding all four core constructs (PE, EE, SI, FC) significantly predicted behavioral intention. However, this investigated student rather than teacher acceptance in vocational rather than general secondary contexts.

This distribution reveals substantial theoretical gap: UTAUT, despite robust predictive power in general educational technology contexts, remains untested in secondary-level inclusive classrooms. This gap is significant because inclusive classrooms present unique conditions such as heightened pedagogical complexity, diverse learner needs, time pressures, and ethical considerations that may alter relative importance of PE, EE, SI, and FC (Tondeur et al., 2017).

Emphasis on Technology Affordances Rather Than Teacher Acceptance

The majority of reviewed studies (n=8, 62%) emphasize technological affordances of AI or student outcomes rather than teacher acceptance, readiness, or behavioral intention to adopt AI. Studies such as Adeleye et al. (2024), Habib et al. (2022), Kumar (2025), and Sathianarayanan et al. (2025) provide valuable insights into AI's potential for personalized learning, accessibility, and inclusive practices. Systematic reviews by Hopcan et al. (2022) and Zawacki-Richter et al. (2019) similarly emphasize technological capabilities while noting limited attention to teacher acceptance and implementation factors. Foundational works such as Holmes and Luckin (2016) argue for AI's transformative potential but acknowledge that realizing this potential requires understanding human factors mediating adoption.

This pattern reflects broader tendency in educational technology research to prioritize innovation and technological capabilities over implementation science and user acceptance (Ertmer & Ottenbreit-Leftwich, 2010; Tondeur et al., 2017). While understanding AI's capabilities is important, technology success ultimately depends on teachers as mediators and implementers. Even sophisticated AI tools will have limited impact if teachers do not accept, trust, or feel capable of integrating them into pedagogy (Watted, 2025). The underrepresentation of teacher-focused acceptance research limits the field's ability to translate AI potential into classroom reality.

Scarcity of Malaysian Empirical Research on Teacher Acceptance

Among the 13 reviewed studies, five were conducted in Malaysia (Sathianarayanan et al., 2025; Melyza Lowa, 2024; Aniq et al., 2024; Khan et al., 2023; Baharin et al., 2025). However, only one (Khan et al., 2023) employed UTAUT to examine teacher acceptance, focusing narrowly on special education teachers with ASD students rather than mainstream inclusive classroom teachers. The remaining Malaysian studies were either conceptual papers (Melyza Lowa, 2024; Aniq et al., 2024; Sathianarayanan et al., 2025) or student-focused quantitative studies (Baharin et al., 2025).

This pattern highlights critical gap: despite Malaysia's substantial policy commitments to digital transformation (Digital Education Policy 2023-2030) and inclusive education (Malaysia Education Blueprint 2013-2025; PPKI framework), empirical research examining teacher acceptance of AI in inclusive secondary classrooms remains virtually nonexistent. This absence of context-specific evidence undermines policymakers' ability to design targeted interventions and limits educators' access to evidence-based guidance (MOE, 2023).

Variability in UTAUT Construct Importance Across Contexts

Among the three studies employing UTAUT or related constructs, notable pattern emerges: Performance Expectancy (PE) consistently appears as strong or strongest predictor of behavioral intention (Watted, 2025; Khan et al., 2023; Baharin et al., 2025). This aligns with broader technology acceptance literature identifying perceived usefulness as primary driver across diverse technologies and contexts (Venkatesh et al., 2003; Teo, 2011).

However, relative importance of other UTAUT constructs varies. Effort Expectancy (EE) was non-significant in Watted (2025) and Khan et al. (2023), suggesting concerns about ease of use may matter less when teachers perceive AI as highly beneficial. In contrast, Baharin et al. (2025) found EE significant among TVET students, possibly reflecting differences between student and teacher populations. Social Influence (SI) emerged significant in Watted (2025) and Baharin et al. (2025), suggesting normative pressures from leadership and colleagues play important roles. Facilitating Conditions (FC) was significant in Khan et al. (2023) and Baharin et al. (2025), highlighting critical importance of infrastructural support, particularly in Malaysian contexts where resource constraints and digital divides are pronounced (MCMC, 2023).

These patterns indicate that while UTAUT provides robust general framework, relative salience of constructs may vary depending on context, population, technology type, and implementation conditions. Inclusive secondary classrooms, characterized by complex pedagogical demands, diverse learner needs, and heavy workloads, may exhibit unique patterns not yet empirically examined.

Critical Research Gaps

The thematic analysis reveals four interrelated gaps justifying need for this conceptual paper and pointing toward critical directions for future empirical research.

Gap 1: Absence of UTAUT-Based Research in Inclusive Secondary School Contexts

Despite widespread UTAUT application in educational technology research, no existing studies apply this framework to examine teacher acceptance of AI specifically in mainstream secondary inclusive classrooms. The three UTAUT-based studies identified focus on general teachers without specifying inclusive contexts (Watted, 2025), specialized teachers in segregated settings (Khan et al., 2023), or student populations in vocational education (Baharin et al., 2025). This gap is critical because inclusive classrooms differ fundamentally from general or specialized settings in pedagogical complexity, learner heterogeneity, support structures, and workload demands. Without empirical validation in this context, it remains unclear whether UTAUT constructs operate similarly or whether their relative importance shifts.

Gap 2: Insufficient Focus on Teacher Acceptance as Mediating Factor
Literature disproportionately emphasizes technological capabilities and student outcomes while underemphasizing teacher acceptance as critical mediating factor in AI implementation. As systematic reviews demonstrate (Hopcan et al., 2022; Zawacki-Richter et al., 2019), most AI in education research focuses on technological possibilities rather than adoption determinants. Teachers are not passive recipients but active agents whose beliefs, attitudes, intentions, and contextual constraints fundamentally shape whether and how technologies integrate into practice (Ertmer & Ottenbreit- Leftwich, 2010; Tondeur et al., 2017). Scarcity of research grounded in established adoption frameworks such as UTAUT limits understanding of psychological, social, and organizational factors facilitating or hindering acceptance.

Gap 3: Limited Empirical Research in Malaysian Inclusive Education Contexts
Despite substantial investments (RM2.4 billion in Budget 2024) and clear policy commitments (PPKI framework; Malaysia Education Blueprint 2013-2025), empirical research on teacher acceptance of AI in Malaysian secondary inclusive classrooms is virtually nonexistent. Existing Malaysian studies focus on conceptual discussions (Melyza Lowa, 2024; Aniq et al., 2024; Sathianarayanan et al., 2025), TVET settings (Baharin et al., 2025), or specific disability categories (Khan et al., 2023) rather than everyday realities of secondary teachers working with heterogeneous inclusive groups. This gap limits ability to generate contextually relevant, culturally appropriate, and practically actionable insights for Malaysian educators and policymakers.

Gap 4: Unclear Mechanisms Linking Acceptance to Sustained Usage
Understanding of mechanisms through which PE, EE, SI, and FC influence sustained AI usage in complex inclusive teaching environments remains limited. Most studies employ cross-sectional designs capturing intentions at single time point, providing little insight into whether intentions translate into sustained practice or how acceptance evolves as teachers gain experience (Venkatesh et al., 2003). In inclusive classrooms where pedagogical decision-making involves ethical considerations (equity, accessibility, student agency), relational priorities (human interaction, social-emotional support), and practical constraints (time, resources, support), pathways from acceptance to meaningful integration may be more complex than UTAUT's predictions suggest.

Summary
In summary, synthesis of 13 recent studies reveals that while AI in education attracts growing scholarly attention, critical gaps persist in understanding teacher acceptance, particularly in inclusive secondary school contexts. The limited UTAUT application (only 23% of studies), predominant focus on technological affordances rather than teacher-mediated adoption (62% of studies), scarcity of Malaysian-based empirical work, and unclear mechanisms linking acceptance to sustained usage collectively justify need for targeted, theoretically grounded, and contextually sensitive research.

Discussion
The synthesis of 13 recent studies on AI in education, technology acceptance frameworks, and inclusive learning has revealed significant patterns, emerging trends, and critical gaps in the literature. This section examines the theoretical, methodological, and practical

implications of these findings for understanding and supporting teacher acceptance of AI in secondary inclusive classrooms.

Theoretical Implications

The findings strongly support UTAUT as a theoretically robust framework for investigating teacher acceptance of AI in education. The consistency with which Performance Expectancy emerges as a strong predictor across diverse contexts (Watted, 2025; Khan et al., 2023; Baharin et al., 2025) affirms the foundational importance of perceived usefulness in driving technology adoption, a pattern well-established in decades of technology acceptance research (Venkatesh et al., 2003; Davis, 1989). For AI in inclusive classrooms specifically, this suggests that teachers' beliefs about whether AI will genuinely enhance their ability to support diverse learners, improve instructional effectiveness, or reduce workload are likely to be primary determinants of adoption.

However, the variable importance of Effort Expectancy, Social Influence, and Facilitating Conditions across studies suggests that UTAUT's predictive power may be contingent on contextual factors warranting deeper investigation. The finding that Effort Expectancy was non-significant in teacher studies (Watted, 2025; Khan et al., 2023) but significant among students (Baharin et al., 2025) raises important questions about whether experienced educators are more willing to invest effort in learning complex technologies when they perceive strong benefits. The prominence of Facilitating Conditions in Malaysian contexts (Khan et al., 2023; Baharin et al., 2025) highlights the critical role of infrastructural support, technical assistance, and training in resource- constrained educational systems (MCMC, 2023).

While UTAUT provides strong foundation, the unique characteristics of inclusive teaching may necessitate theoretical extensions. Inclusive classrooms differ from general education settings in fundamental ways that could influence technology acceptance beyond what PE, EE, SI, and FC predict. Teachers must balance competing pedagogical priorities within severe time and resource constraints, raising questions about perceived pedagogical fit or alignment with inclusive education principles (Tondeur et al., 2017). Inclusive education is fundamentally grounded in values of equity, human dignity, and relational pedagogy (UNESCO, 2020). Teachers may hold concerns about AI that extend beyond UTAUT's organizational dimensions to encompass ethical considerations: Does AI perpetuate bias? Does it reduce students to data points? Does it erode human relationships central to inclusive teaching (Holmes et al., 2021)? These concerns suggest that constructs related to perceived ethical alignment or trust in AI may play important roles in shaping acceptance in inclusive contexts.

Methodological Implications

The absence of UTAUT-based research in inclusive secondary school contexts represents both a theoretical gap and a methodological imperative. Applying established frameworks to new contexts without validation risks inappropriate generalization (Venkatesh et al., 2003). The variability in UTAUT construct importance observed across reviewed studies underscores the importance of context-specific validation.

Future research should employ rigorous quantitative methods, such as confirmatory factor analysis to validate measurement structure of UTAUT constructs in inclusive teaching contexts, and structural equation modeling or regression analysis to test hypothesized relationships. Such validation studies should also examine potential moderating effects of teacher characteristics (experience, training in special education, digital literacy) and school characteristics (urban vs. rural, availability of support staff, PPKI vs. mainstream inclusion).

While quantitative validation of UTAUT is essential, the complexity of inclusive teaching suggests that mixed-methods designs may provide most comprehensive insights. Qualitative components could illuminate the meanings teachers attach to UTAUT constructs, the contextual factors shaping their perceptions, and the barriers preventing intentions from translating into sustained practice. The reviewed studies predominantly employ cross-sectional designs (Watted, 2025; Khan et al., 2023; Baharin et al., 2025). Longitudinal research tracking teachers' acceptance, implementation, and sustained usage over time would provide more robust evidence about stability of UTAUT predictions and factors facilitating translation of intention into practice.

Practical Implications

The findings have several important implications for education policymakers, school leaders, and teacher educators seeking to support AI integration in inclusive secondary classrooms.

For policymakers, the consistent importance of Performance Expectancy suggests that policies and initiatives must clearly articulate and demonstrate how AI tools address real pedagogical challenges teachers face in inclusive classrooms. Generic claims about AI's transformative potential are unlikely to be persuasive; instead, policymakers should invest in developing and showcasing evidence-based AI applications with demonstrated effectiveness in inclusive settings. The prominence of Facilitating Conditions in Malaysian contexts (Khan et al., 2023; Baharin et al., 2025) highlights inadequacy of focusing solely on infrastructure procurement without corresponding investments in training, technical support, and ongoing professional development. The National Audit Report's (2022) finding that 62% of ICT equipment in Malaysian schools is underutilized underscores this point.

For school leaders, the importance of Social Influence (Watted, 2025; Baharin et al., 2025) suggests that principals' attitudes toward AI, their explicit endorsement of AI integration, and their visible use of AI can significantly influence teachers' acceptance. Leaders who model AI usage, celebrate teacher experimentation, and create safe spaces for trial-and-error learning are more likely to foster school culture conducive to innovation. Moreover, the critical role of Facilitating Conditions emphasizes that school leaders must go beyond encouragement to create tangible supports: allocating time for teachers to learn and experiment with AI tools, providing access to technical troubleshooting and pedagogical coaching, and establishing collaborative structures where teachers can share strategies and problem-solve together (Tondeur et al., 2017).

For teacher educators and professional development providers, the findings suggest that training should be designed with UTAUT constructs in mind. To build Performance Expectancy, professional learning should provide concrete, evidence-based examples of how AI tools address real inclusive teaching challenges. To address Effort Expectancy, training

should scaffold learning progressively and offer ongoing support rather than one-time sessions. To leverage Social Influence, professional development could create communities of practice where teachers share successes and challenges. To strengthen Facilitating Conditions, training should be paired with provision of necessary tools, technical support, and protected time for implementation.

Importantly, professional development should address specific pedagogical, ethical, and practical considerations relevant to inclusive education: how to select AI tools appropriate for diverse learners, how to adapt AI outputs for students with varied needs, how to critically evaluate AI for bias and appropriateness, and how to balance AI use with human interaction and relationship-building (Akgun & Greenhow, 2022; Holmes et al., 2021).

Limitations

Several limitations of this review should be acknowledged. The narrative synthesis approach, while appropriate for consolidating fragmented literature, lacks systematic rigor and exhaustive coverage of full systematic reviews. Some relevant studies may have been inadvertently excluded, particularly those published in languages other than English or Malay. The inclusion of diverse study types with varying methodological rigor introduces heterogeneity that complicates direct comparison. The focus on recent literature (2016-2025) may have overlooked earlier foundational work beyond seminal theoretical contributions. The review's interpretive nature introduces potential for subjective bias in thematic coding, although efforts were made to ground interpretations in explicit textual evidence.

Despite these limitations, the review achieves its primary goals: consolidating knowledge across fragmented literatures, identifying convergent patterns and critical gaps, and providing conceptual foundation and justification for future UTAUT-informed empirical research on teacher acceptance of AI in secondary inclusive classrooms.

Conclusion and Future Research Directions

Artificial intelligence holds significant promise for transforming education and advancing inclusive education goals through equitable access, personalized learning, reduced barriers, and enhanced teacher capacity to support diverse learners. However, realizing this promise depends critically on teachers: their acceptance of AI, their readiness to integrate it into practice, and their confidence that AI will genuinely serve rather than undermine values and relationships at the heart of inclusive teaching.

This conceptual paper has demonstrated that current research on teacher acceptance of AI in inclusive secondary classrooms is limited, fragmented, and insufficient to guide evidence-based policy and practice. Through systematic review and synthesis of 13 empirical and conceptual studies, this paper has made several important contributions. First, it has consolidated fragmented knowledge across educational technology, inclusive education, and technology acceptance research domains. Second, it has identified four critical gaps: (i) absence of UTAUT-based research in inclusive secondary contexts (only 23% of studies employed UTAUT, none in mainstream inclusive classrooms); (ii) insufficient focus on teacher acceptance as mediating factor (62% of studies emphasize technological affordances over adoption determinants); (iii) limited Malaysian empirical work despite national policy

commitments; and (iv) unclear mechanisms linking acceptance to sustained usage in complex pedagogical environments.

Third, this paper has demonstrated that while UTAUT provides theoretically sound and empirically validated foundation for investigating technology acceptance, its application to inclusive teaching contexts requires careful validation and potential extension to capture factors unique to this setting. Fourth, it has articulated clear theoretical, methodological, and practical implications that can guide future research, inform policy development, support school leadership, and shape professional development for teachers working in inclusive classrooms.

The synthesis reveals that across diverse contexts, Performance Expectancy consistently emerges as primary driver of technology adoption, suggesting that teachers' beliefs about AI's capacity to enhance their effectiveness in supporting diverse learners are central to acceptance. However, the variable importance of Effort Expectancy, Social Influence, and Facilitating Conditions indicates that contextual factors moderate UTAUT relationships in ways warranting deeper investigation. In Malaysian contexts specifically, the prominence of Facilitating Conditions underscores critical importance of infrastructure, support, and training in enabling teacher adoption, particularly given digital divides between urban and rural schools (MCMC, 2023).

For Malaysia specifically, the findings have particular urgency. Despite strong government commitment to digital transformation (Digital Education Policy 2023-2030; RM2.4 billion investment) and inclusive education (Malaysia Education Blueprint 2013-2025; PPKI framework), there is virtually no research examining how 2,117 secondary school teachers responsible for educating over 95,000 students with special needs perceive, accept, and intend to use AI in their inclusive classrooms. This knowledge gap has serious consequences: without understanding factors that facilitate or hinder teacher acceptance in Malaysian inclusive contexts, policymakers risk designing interventions that miss the mark, school leaders lack evidence-based guidance, and teacher educators cannot tailor professional development to address most salient barriers and enablers.

Future Research Directions

Based on identified gaps, this paper proposes three specific priorities for future empirical research. First, rigorous quantitative validation of UTAUT in inclusive secondary contexts is urgently needed. Future studies should employ large-scale survey designs with representative samples of inclusive education teachers to ensure adequate statistical power and generalizability. In Malaysian context, this would involve sampling from the population of 2,117 teachers across diverse geographical regions, school types (PPKI vs. mainstream inclusion), and demographic characteristics. Studies should use validated measurement instruments for UTAUT constructs adapted specifically for AI technologies and inclusive teaching contexts. Advanced statistical techniques such as structural equation modeling should test hypothesized relationships between UTAUT constructs and behavioral intention, examine model fit, and assess relative predictive strength of each construct. Investigation of potential moderating effects of teacher characteristics (experience in inclusive education, training in special education, digital literacy) and school characteristics (urban vs. rural

location, availability of support staff, resource level) would illuminate for whom and under what conditions each construct is most influential.

Second, exploration and testing of model extensions should investigate whether UTAUT requires enhancement to fully capture factors influencing teacher acceptance in inclusive contexts. Potential extensions include perceived pedagogical fit (extent to which teachers believe AI aligns with inclusive education principles), perceived ethical alignment or trust (extent to which teachers trust AI to be unbiased, protect student privacy, and respect dignity), and self-efficacy for inclusive technology integration (teachers' confidence in their ability to select, adapt, and use AI tools effectively for students with diverse needs). Research could employ exploratory qualitative methods to identify additional factors teachers perceive as important, followed by quantitative survey development and validation to test whether these factors provide incremental predictive power beyond core UTAUT constructs.

Third, mixed-methods investigations of acceptance mechanisms should combine quantitative surveys with qualitative interviews or focus groups to explore meanings teachers attach to UTAUT constructs, trade-offs and tensions they navigate when deciding whether to adopt AI, and barriers preventing behavioral intentions from translating into sustained usage. Such research would provide richer, more nuanced insights complementing quantitative findings and generating actionable recommendations grounded in teachers' authentic experiences. Longitudinal studies tracking teachers' acceptance and usage over time would illuminate whether intentions predict sustained practice and how acceptance evolves as teachers gain experience.

Concluding Remarks

The future of AI in education depends fundamentally on understanding and supporting teacher acceptance. By centering teachers' voices, experiences, and professional judgment in AI integration efforts; by grounding policy in evidence rather than assumption; and by attending to ethical, pedagogical, and relational dimensions of teaching alongside technological capabilities, we can work toward a future where AI genuinely enhances rather than undermines the promise of inclusive education.

This paper has provided both conceptual foundation and empirical justification for that endeavor. The UTAUT framework offers a scientifically validated starting point, but its application must be adapted to Malaysian realities through careful validation, potential extension, and integration with qualitative insights into teachers' lived experiences. The proposed research directions provide a roadmap for building the knowledge base necessary to support teachers, inform policy, and ultimately ensure that AI serves as a catalyst for more inclusive, effective, and humanizing educational practices. As AI technologies continue to evolve and proliferate, the imperative to understand and support teacher acceptance will only grow more urgent. The time to invest in this research is now.

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