



Teacher-Mediated Integration of Artificial Intelligence Tools in Special Education: A Phenomenological Study of Inclusive Classroom Practices

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Abstract

Background and Aim: Artificial Intelligence (AI) integration has great potential to improve personalized and inclusive education. In Special Education (SPED), this potential is especially significant for meeting the diverse and individual needs of learners with disabilities. Guided by the Technology Acceptance Model (TAM) and Universal Design for Learning (UDL) principles, this study explored the lived experiences of SPED teachers in using AI tools, focusing on their practical applications, challenges encountered, and the support systems necessary for successful implementation.

Materials and Methods: A qualitative phenomenological design was employed, involving semi-structured in-depth interviews with ten special education teachers. Their accounts of using AI tools in the classroom were collected and transcribed verbatim. The data were then analyzed thematically to identify significant patterns and lived experiences.

[1/20]

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Results: Three main themes emerged from the analysis: (1) teacher-mediated integration, where educators used AI tools as extensions of their expertise to support differentiated instruction rather than as autonomous substitutes; (2) ambivalent experiences characterized by both empowerment through time savings and frustration due to inadequate infrastructure, insufficient training, and lack of cultural relevance; and (3) socio-technical and infrastructural barriers that positioned AI implementation as an organizational process requiring systemic support. The findings demonstrate that successful AI integration depends on strong institutional support while preserving teacher professional judgment—a finding consistent with TAM's emphasis on perceived usefulness and UDL's focus on flexible, learner-responsive design.

Conclusion: The study concludes that AI tools have significant potential to promote inclusive education when used as assistive tools mediated by teacher expertise. Their successful and ethical adoption, however, depends on systemic interventions including specialized training, reliable infrastructure, and supportive institutional structures. Rather than replacing teachers, AI serves as a valuable enhancement to educators' capacity to meet diverse learner needs. These findings highlight that AI integration in special education is fundamentally a technological education management issue requiring coordinated organizational support.

Keywords: Artificial intelligence; special education; special education teachers; inclusive education; technology integration; socio-technical systems; teacher mediation

Introduction

Artificial Intelligence (AI) represents one of the most significant technological advancements in contemporary education, offering transformative potential for teaching and learning processes. Its integration into educational systems, however, is not merely a technical innovation but a complex management process that requires strategic leadership, coherent policy frameworks, adequate infrastructure, and systematic teacher preparation. From the perspective of technological education management, successful AI adoption depends on organizational readiness, stakeholder capacity, and alignment with pedagogical goals (Srivastava & Dixit, 2023; Zavodna et al., 2024). In recent years, multiple studies have shown that AI can help students receive instant feedback, increase motivation, and reduce teachers' routine workload (Rodriguez and Naval, 2025; Harkins-Brown et al., 2025), thereby addressing key instructional challenges in diverse classroom settings.

To understand AI integration in education, several theoretical frameworks provide useful analytical lenses. The Technology Acceptance Model (TAM) posits that perceived usefulness and perceived ease of use are primary determinants of technology adoption (Davis, 1989). Innovation Diffusion Theory (Rogers, 2003) explains how new technologies spread within social systems, emphasizing the roles of communication channels, time, and social context. Within special education specifically, Universal Design for Learning (UDL) offers principles for creating flexible learning environments that accommodate learner variability through multiple means of engagement, representation, and expression (CAST, 2018). These frameworks collectively suggest that AI integration is shaped by individual perceptions, organizational factors, and inclusive design principles—a perspective that guides the present study.

AI tools in education can be categorized according to their primary functions and applications. Conversational AI, including chatbots such as ChatGPT, enables interactive dialogue, question-answering, and practice opportunities for learners (Rodriguez & Langam, 2025). Adaptive learning systems, exemplified by platforms like ALEKS and DreamBox, dynamically adjust content difficulty and pacing based on student performance data (Ahmad et al., 2024). Assistive AI technologies, including speech recognition, text-to-speech, and grammar checkers, support learners with communication and literacy difficulties (Mahmoudi-Dehaki & Nasr-Esfahani, 2024; Mitre & Zeneli, 2024). Immersive AI applications, such as virtual reality simulations and AI-enhanced wearables like Google Glass, provide contextualized learning experiences and social skills training (Ahmad et al., 2024). This functional categorization helps clarify how different AI tools serve distinct educational purposes while collectively contributing to more inclusive learning environments.





Within the ASEAN region, research on AI in education remains unevenly distributed, with Malaysia producing the majority of publications while other countries, including the Philippines, lag behind (Rodriguez & Naval, 2025). This disparity is significant from a technological education management perspective because educational systems across Southeast Asia operate under varying infrastructure conditions, policy environments, and teacher preparation frameworks. Understanding AI adoption in special education requires attention to these contextual factors, as infrastructure limitations, inconsistent internet connectivity, and varying levels of technological readiness directly influence implementation feasibility and sustainability (Turyasingura et al., 2024). The limited regional collaboration identified in bibliometric studies (Rodriguez & Naval, 2025) further underscores the need for contextually grounded research that examines how teachers in specific ASEAN countries navigate AI integration within their local constraints.

In special education, AI's potential is particularly significant because learners with disabilities require individualized support that responsive technologies can provide. The alignment between AI applications and UDL principles is especially relevant here. Conversational AI can offer multiple means of engagement by providing interactive, motivating learning experiences. Adaptive systems support multiple means of representation by adjusting content presentation to match learner needs. Assistive technologies enable multiple means of expression by offering alternative communication and production modes (CAST, 2018; Ramaiah et al., 2024). Thus, AI functions not as an isolated tool but as part of an inclusive educational ecosystem where technology amplifies teachers' capacity to address diverse learning profiles (Harkins-Brown et al., 2025; Ahmad et al., 2024).

Despite these possibilities, teachers encounter substantial challenges in utilizing AI effectively. From an organizational readiness perspective, barriers include inadequate infrastructure, insufficient technical support, and lack of specialized training (Roshan et al., 2024; Rostami & Longo, 2024). Digital competence frameworks emphasize that technology integration requires not only access to tools but also the knowledge, skills, and confidence to apply them pedagogically (Fakhar, 2024). Teachers' AI readiness—their familiarity with AI tools, understanding of their educational applications, and ability to critically evaluate AI-generated content—emerges as a critical variable influencing implementation quality (Rostami & Longo, 2024). Without systematic professional development, AI tools risk becoming underutilized resources or, worse, sources of frustration that detract from instructional goals.

Ethical considerations further complicate AI integration in special education, raising issues that extend beyond individual classrooms to institutional governance structures. Data privacy concerns emerge when student information is processed by AI systems without clear protocols for storage, access, and consent (Scott et al., 2024). Algorithmic bias, wherein AI tools may reflect or amplify societal prejudices present in their training data, poses particular risks for already marginalized learners with disabilities (Wulandari & Purnamaningwulan, 2024). Cultural appropriateness of AI-generated content also warrants attention, as tools developed in Western contexts may produce materials misaligned with local values, languages, and experiences (Turyasingura et al., 2024). These ethical dimensions demand policy frameworks, institutional oversight, and teacher training that equip educators to navigate complex decisions about when and how to deploy AI responsibly.

A significant gap in the existing literature concerns the lived experiences of special education teachers themselves. While substantial research examines AI's technical capabilities, student outcomes, and system designs, comparatively little attention has been paid to how teachers perceive, interpret, and negotiate AI integration in their daily practice (Munni & Rafique, 2025; Wulandari & Purnamaningwulan, 2024). This gap is consequential because teachers are not merely passive recipients of technological change but active agents whose decisions shape whether and how AI tools enhance learning. In special education contexts, where instruction is highly individualized and relational, teacher perspectives are especially critical. Their professional judgments determine which tools are selected, how they are adapted, and when they are supplemented or set aside. Understanding these experiences is therefore essential for developing realistic, context-sensitive approaches to AI implementation.

The present study addresses this gap by exploring the experiences of special education teachers who have integrated AI tools into their classrooms. Specifically, it seeks to answer the following





research questions: (1) What AI tools do special education teachers use in their instructional practice? (2) How do these teachers describe their experiences integrating AI tools, including perceived benefits and challenges? (3) What barriers do they encounter in utilizing AI effectively? (4) What support systems and resources do they identify as necessary for sustainable AI integration? By focusing on teachers' lived experiences, this research aims to generate insights that inform professional development, institutional policy, and technology design, ultimately contributing to more effective and equitable use of AI in inclusive education.

Objectives

This study generally aimed to identify and classify the types of Artificial Intelligence (AI) tools utilized by special education teachers and to analyze their functional roles in supporting personalized and inclusive learning for learners with special needs. The central question guiding this study was: "What are the lived experiences of special education teachers in utilizing AI tools to support learners with special needs?"

Specifically, this study sought to answer the following questions:

1. What AI tools do special education teachers utilize in their classrooms, and how can these tools be classified according to their pedagogical functions?
2. How do special education teachers describe their experiences integrating AI tools, particularly regarding perceived usefulness, ease of use, and alignment with inclusive education principles?
3. What challenges and barriers do special education teachers encounter in utilizing AI tools, including infrastructural, technical, pedagogical, and ethical dimensions?
4. What support systems, resources, and professional development opportunities do teachers identify as necessary for the effective and sustainable integration of AI in special education classrooms?

Literature Review

Artificial Intelligence (AI) has emerged as a transformative force in education, offering significant potential to enhance teaching and learning processes across diverse contexts. Its integration into educational systems, however, extends beyond technical implementation to encompass complex organizational, pedagogical, and human dimensions. From a technological education management perspective, successful AI adoption requires alignment between technological innovation, teacher capacity, institutional readiness, and inclusive design principles (Srivastava & Dixit, 2023; Zavodna et al., 2024). This literature review examines existing research on AI in education through five thematic lenses: (1) theoretical foundations for AI integration, (2) AI applications for differentiated instruction in special education, (3) teacher acceptance and attitudes toward AI, (4) socio-technical and infrastructural barriers, and (5) ethical and cultural considerations. Within each theme, the review synthesizes empirical findings, identifies theoretical connections, and establishes the research gap addressed by the present study.

Theoretical Foundations for AI Integration in Special Education

Two theoretical frameworks are particularly relevant to understanding AI integration in special education: the Technology Acceptance Model (TAM) and Universal Design for Learning (UDL). TAM, originally developed by Davis (1989), posits that perceived usefulness—the degree to which an individual believes technology enhances job performance—and perceived ease of use—the degree to which technology is perceived as effortless—are primary determinants of technology adoption. Subsequent extensions, such as TAM2 and TAM3, have incorporated additional variables including subjective norm, voluntariness, and experience (Venkatesh & Bala, 2008). Within special education contexts, teacher perceptions of AI's usefulness for addressing diverse learner needs, alongside their confidence in operating AI tools, significantly influence integration decisions (Fakhar, 2024; Rostami & Longo, 2024). The ambivalence teachers experience—excitement about AI's potential combined with frustration when tools prove difficult to use—directly reflects TAM's core constructs. When perceived ease of use is low, even highly useful tools may face resistance (Kefi, 2024; Hauser, 2024).





UDL provides a complementary framework by articulating how learning environments can accommodate learner variability. Its three principles—multiple means of engagement (the "why" of learning), representation (the "what" of learning), and expression (the "how" of learning)—offer a structure for evaluating AI's role in inclusive education (CAST, 2018). AI technologies align with UDL principles when they provide flexible pathways for students to access content, demonstrate understanding, and maintain motivation (Ramaiah et al., 2024). For example, text-to-speech applications support multiple means of representation by converting written text into auditory formats, while adaptive learning systems enable multiple means of engagement by adjusting task difficulty to match student readiness (Ahmad et al., 2024). Together, TAM and UDL frame AI integration as both a technological adoption process shaped by teacher perceptions and an inclusive design challenge requiring pedagogical responsiveness.

AI Applications for Differentiated Instruction in Special Education

Empirical research has documented diverse AI applications that support differentiated instruction for learners with special needs. These applications can be categorized according to their primary pedagogical functions. Conversational AI tools, including chatbots such as ChatGPT, facilitate language practice, provide immediate feedback, and offer scaffolded learning interactions. A study in the Philippines demonstrated that students who practiced grammar with ChatGPT showed significant improvement in test performance, suggesting conversational AI's potential for skill development (Rodriguez & Langam, 2025).

Adaptive learning systems, such as ALEKS and DreamBox, dynamically adjust content difficulty, pacing, and sequencing based on real-time student performance data (Ahmad et al., 2024; Xu, 2023). These systems embody UDL principles by offering multiple pathways through content and enabling students to progress at their own pace. Research indicates that adaptive technologies can improve learning outcomes for students with diverse cognitive profiles by providing appropriately challenging tasks and reducing frustration associated with mismatched instruction (Harkins-Brown et al., 2025).

Assistive AI technologies address specific communication and learning barriers. Speech recognition software supports students with writing difficulties by transcribing spoken words into text, while text-to-speech applications benefit learners with reading disabilities, including dyslexia, by providing auditory access to written materials (Mahmoudi-Dehaki & Nasr-Esfahani, 2024; Mitre & Zeneli, 2024). Grammar checkers and predictive text tools assist students with learning disabilities in producing written work, reducing mechanical barriers and enabling focus on content generation (Ramaiah et al., 2024).

Immersive AI technologies, including virtual reality (VR) simulations and AI-enhanced wearables, offer contextualized learning experiences. VR environments can simulate social situations for students with autism spectrum disorder, providing safe spaces to practice interaction skills (Ahmad et al., 2024). Tools like Google Glass have been used to deliver social cues and prompts, supporting real-time skill application (Mitre & Zeneli, 2024). These applications demonstrate AI's capacity to create learning experiences that would be difficult or impossible to replicate in traditional classroom settings.

Teacher Acceptance, Readiness, and Attitudes Toward AI

Teacher acceptance is a critical determinant of successful AI integration. Drawing on TAM, research has examined how perceived usefulness and ease of use shape teachers' willingness to adopt AI tools. Fakhar (2024) found that teachers with higher AI readiness—defined as familiarity with AI tools, understanding of their educational applications, and confidence in using them—reported more positive attitudes and greater perceived usefulness. Conversely, teachers who lacked training and confidence experienced anxiety and resistance, viewing AI as a burden rather than an asset (Rostami & Longo, 2024).

Ambivalence emerges as a recurring theme in teacher experiences with AI. Educators simultaneously recognize AI's potential to reduce workload and enhance personalization while expressing frustration with technical difficulties, poor infrastructure, and time required to adapt AI-generated materials (Kefi, 2024). This ambivalence reflects the gap between AI's promised benefits and





its actual usability in classroom contexts—a gap that TAM conceptualizes as the tension between perceived usefulness and perceived ease of use. Hauser (2024) notes that such mixed feelings are characteristic of complex technology adoption, particularly when innovations disrupt established routines without providing adequate support.

Digital competence frameworks offer additional analytical tools for understanding teacher readiness. Beyond basic technical skills, effective AI integration requires pedagogical knowledge about how to leverage AI for specific instructional purposes, critical evaluation skills to assess AI-generated content, and ethical awareness to navigate privacy and bias concerns (Roshan et al., 2024). Studies consistently report that teachers lack systematic training in these areas, resulting in trial-and-error learning and inconsistent implementation (Bekdemir, 2024; Sahoo et al., 2024).

Socio-Technical and Infrastructural Barriers: A Management Perspective

From a technological education management perspective, AI integration is not solely an individual teacher concern but an organizational process requiring systemic support. Socio-technical systems theory posits that successful technology implementation depends on alignment between technical components (hardware, software, connectivity) and social components (people, skills, culture, structures) (Srivastava & Dixit, 2023). In special education contexts, this alignment is particularly challenging due to resource constraints, varying infrastructure quality, and the need for specialized assistive technologies.

Infrastructure barriers remain persistent obstacles. Unreliable internet connectivity, insufficient devices, and outdated hardware prevent consistent AI use, particularly in developing countries and underserved regions (Turyasingura et al., 2024). These constraints reduce perceived ease of use and undermine teachers' willingness to invest time in learning AI tools, as the likelihood of technical failure disrupts lesson flow and creates classroom management challenges (Roshan et al., 2024). Digital equity—ensuring all schools have adequate technological infrastructure—emerges as a prerequisite for meaningful AI integration rather than an optional enhancement.

Institutional readiness encompasses policy frameworks, leadership support, and resource allocation. Research indicates that schools with clear policies regarding AI use, dedicated technology coordinators, and budget allocations for maintenance and upgrades achieve more consistent and effective implementation (Zhang, 2023). Conversely, in the absence of institutional support, AI integration remains fragmented, dependent on individual teacher initiative, and vulnerable to disruption when those teachers leave or face challenges (Zavodna et al., 2024). Change management principles suggest that successful innovation requires vision, communication, training, and incentives aligned across organizational levels (Bekdemir, 2024).

Professional development emerges as a critical institutional responsibility. However, studies reveal that most teacher training programs lack AI-specific content, particularly content tailored to special education contexts (Sahoo et al., 2024). Generic technology workshops fail to address the unique demands of adapting AI for learners with disabilities, including selecting appropriate tools, modifying AI-generated materials, and integrating AI with existing assistive technologies (Silva & Trindade, 2024). Effective professional development, research suggests, should be ongoing, practice-based, and collaborative, enabling teachers to learn from peers and reflect on their experiences (Bekdemir, 2024).

Ethical and Cultural Considerations in AI-Enhanced Special Education

Ethical governance constitutes a fundamental dimension of technological education management, particularly in special education where student vulnerability heightens the stakes of technology use. Data privacy emerges as a primary concern: AI systems often collect, store, and process student data, raising questions about consent, data security, and potential misuse (Scott et al., 2024). In special education contexts, where student information may include sensitive diagnostic and behavioral data, clear protocols for data governance are essential. Educational data governance frameworks emphasize the need for transparency, parental consent, data minimization, and secure storage (Wulandari & Purnamaningwulan, 2024).

Algorithmic bias presents another significant ethical challenge. AI tools trained on datasets that underrepresent learners with disabilities may produce outputs that are inappropriate, inaccurate, or harmful for this population (Scott et al., 2024). Bias can manifest in various ways: adaptive systems





may misinterpret disability-related behaviors as poor performance; language models may generate content that assumes neurotypical communication patterns; and assessment tools may lack validation for diverse learner populations. Addressing algorithmic bias requires diverse training data, ongoing evaluation, and teacher mediation to identify and correct inappropriate outputs.

Cultural appropriateness of AI-generated content warrants attention, particularly in non-Western educational contexts. Many AI tools are developed in Western countries and trained on Western-centric datasets, producing materials that may not align with local languages, values, or experiences (Turyasingura et al., 2024). For learners with special needs, who may already experience marginalization, culturally inappropriate content can compound exclusion. Teachers in the Philippines and other ASEAN countries report needing to substantially modify AI-generated materials to fit local contexts, a time-consuming process that reduces the efficiency gains AI promises (Rodriguez & Naval, 2025).

Ethical AI principles for education emphasize human oversight, transparency, fairness, and accountability (Chambers, 2020). These principles translate into institutional responsibilities: developing clear policies, providing teacher training on ethical AI use, establishing procedures for reviewing AI-generated content, and creating mechanisms for addressing concerns when problems arise. In special education, where the consequences of ethical failures are particularly severe, such governance structures are not optional additions but core components of responsible AI integration.

The preceding review reveals a significant gap in the existing literature. While substantial research examines AI's technical capabilities, student learning outcomes, and system-level designs, comparatively few studies center on teachers' lived experiences of AI integration (Munni & Rafique, 2025; Wulandari & Purnamaningwulan, 2024). Outcome-focused studies demonstrate that AI can improve student engagement and achievement under controlled conditions, but they provide limited insight into how teachers navigate AI use in the complexity of daily classroom practice. System-design studies propose ideal implementations but rarely account for the contextual constraints teachers face, including infrastructure limitations, time pressures, and diverse student needs.

Teacher-centered research that does exist tends to focus on general attitudes or intentions rather than detailed phenomenological accounts of integration experiences (Fakhar, 2024; Rostami & Longo, 2024). Surveys measuring teacher perceptions, while valuable, cannot capture the nuanced ways teachers negotiate AI use, adapt tools to individual learners, experience frustration and empowerment simultaneously, or make ethical judgments in real time. In special education, where instruction is highly individualized and relational, understanding these experiential dimensions is particularly critical. Teachers' professional knowledge, developed through years of practice with diverse learners, shapes how they select, modify, and evaluate AI tools—yet this knowledge remains largely undocumented in the research literature.

The present study addresses this gap by conducting a phenomenological exploration of special education teachers' lived experiences with AI tools. By centering teacher voices and examining how they make meaning of AI integration within their specific contexts, this research aims to generate insights that complement and extend existing outcome-focused and design-focused studies. Understanding teacher experiences is essential not only for improving professional development and institutional support but also for developing AI tools that are genuinely useful and usable in inclusive classrooms. From a technological education management perspective, teacher-centered inquiry illuminates the human dimensions of innovation adoption, revealing how organizational policies and resources translate—or fail to translate—into meaningful classroom practice.

Conceptual Framework

Figure 1 shows that the conceptual framework is cyclic and interdependent, meaning that the factors that affect the successful implementation of AI tools in Special Education (SPED) classrooms rely on each other. The desired outcome of Effective AI Integration in SPED Classrooms is in the middle and directly influenced by two major elements: Teachers Experiences in Integrating AI and Support Resources. The framework assumes that practical experiences of teachers of AI tools are a key factor of the successful implementation, but the experiences in turn are predetermined by the Challenges



Encountered in the process of integration. Moreover, finding these challenges determines the kind and amount of support and resources needed which forms a loop in which combating the challenges and giving the support tailored to the challenges improves the experiences of teachers. This, in its turn, facilitates more efficient, sustainable, and inclusive AI implementation in the specific teaching setting.

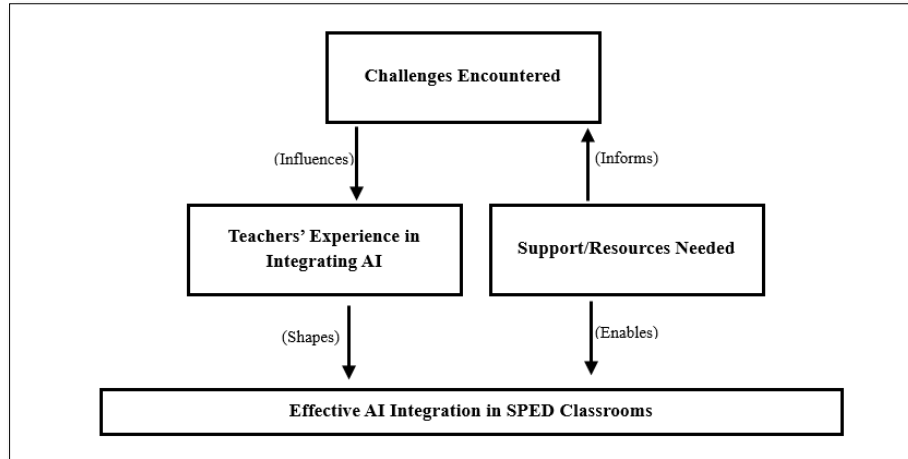


Figure 1. Conceptual Framework of the Study

Methodology

1. Research Design

This study employed a qualitative phenomenological design to explore the lived experiences of special education teachers using AI tools. Phenomenology was appropriate as the study sought to understand how teachers make meaning of AI integration in their classrooms—a human-centered change process—rather than to measure variables or generate theory (Creswell & Poth, 2018). This design aligns with technological education management research by illuminating the subjective dimensions of innovation adoption.

2. Research Participants

Ten special education (SPED) teachers participated, selected through purposive criterion sampling. Inclusion criteria were: (a) current SPED teaching assignment; (b) minimum five years of experience; and (c) active classroom use of AI tools (e.g., ChatGPT, text-to-speech applications). Participants taught students across diverse disability categories (intellectual disabilities, autism spectrum disorder, learning disabilities) and represented varying school contexts in terms of technological infrastructure. The sample size of ten is consistent with phenomenological research, and data saturation guided adequacy—recurring themes emerged by the eighth interview, with the final two confirming saturation (Guest et al., 2006).

3. Research Instrument

A semi-structured interview guide served as the primary instrument. Questions were explicitly aligned with the study's theoretical frameworks: Technology Acceptance Model (perceived usefulness, ease of use) and Universal Design for Learning (differentiated instruction, multiple means of engagement). Sample questions included: "How has using AI tools affected your teaching practice?" and "What difficulties have you faced when using AI?" The guide underwent expert validation by three specialists and was pilot-tested with one SPED teacher to refine clarity and relevance.

4. Data Gathering Procedure

Following ethical approval, in-depth, one-on-one semi-structured interviews were conducted face-to-face at participants' school in a private room. Each interview lasted 45–60 minutes. With informed consent, sessions were audio-recorded and transcribed verbatim. Transcripts were verified against recordings, anonymized using pseudonyms (Teacher 1–10), and imported into qualitative analysis software. The interviewer maintained reflexive notes to document initial impressions and support bracketing.

5. Data Analysis



Analysis followed Moustakas's (1994) phenomenological procedures. Researchers engaged in immersive reading of transcripts to develop holistic understanding. Significant statements relevant to AI integration were identified through horizontalization, then clustered into themes and sub-themes. Theme development was both inductive and theoretically informed by TAM and UDL. Bracketing was supported through reflexive journaling and research team discussions to minimize bias. To enhance credibility, member checking (with three participants), peer debriefing, and an audit trail were employed. Themes were synthesized into descriptive accounts capturing the essence of teachers' lived experiences.

6. Ethical Considerations

Ethical approval was obtained prior to data collection. Participants provided written informed consent, were assured of anonymity, and informed of their right to withdraw without consequence. Audio recordings and transcripts were stored on password-protected devices, with identifying information removed. Given the sensitivity of special education contexts, the interviewer remained attentive to participant discomfort and reminded them they could decline any question.

Trustworthiness was established through Lincoln and Guba's (1985) criteria: credibility (member checking, peer debriefing), transferability (thick description of participants and contexts), dependability (audit trail), and confirmability (reflexive journaling, bracketing).

Results

Utility and Application of AI Tools

Teachers consistently identified AI tools as practical instruments that enhanced both teaching efficiency and instructional responsiveness in their SPED classrooms. According to participants, these tools enabled them to manage heavy workloads while simultaneously addressing the unique and often complex needs of learners with disabilities. AI supported lesson planning and classroom activities, serving as a means through which teachers implemented differentiation and personalized instruction. Notably, teachers emphasized that AI usage did not substitute for professional judgment but rather required critical supervision and adaptation. Three distinct patterns emerged regarding how teachers utilized AI: the use of accessible and practical tools, the enhancement of personalized and differentiated learning, and the automation of routine tasks for efficiency.

Use of Accessible and Practical Tools. Teachers consistently highlighted the importance of AI tools that could be easily integrated into their daily classroom routines without requiring extensive technical expertise. They reported using ChatGPT to create social stories for students with autism, text-to-speech applications to facilitate communication for non-verbal learners, and grammar checkers to support students with learning disabilities in writing tasks. The accessibility and immediate usefulness of these tools were highly valued, as they allowed teachers to respond more effectively to diverse student needs without investing significant time in learning complex systems.

"I use ChatGPT to create simple social stories for my autistic students. It saves me hours of work." (Teacher 3)

"Text-to-speech apps help my non-verbal students communicate during lessons." (Teacher 7)

"Grammar checkers assist my students with learning disabilities in writing tasks." (Teacher 5)

These experiences reflect the Technology Acceptance Model's assertion that perceived usefulness drives technology adoption (Davis, 1989). Teachers embraced tools that offered immediate solutions to pressing instructional challenges. However, from a technological education management perspective, these findings also reveal that accessibility alone is insufficient to ensure sustained integration. Teachers' ability to use these tools was mediated by institutional factors beyond their control—particularly whether their schools provided reliable internet access, adequate devices, and permission to explore AI applications. When these organizational conditions were absent, even highly useful tools remained underutilized. This suggests that perceived usefulness, while necessary, is not sufficient for adoption; institutional readiness and resource allocation function as enabling conditions that transform individual teacher interest into sustained classroom practice (Srivastava & Dixit, 2023). The finding that teachers gravitated toward tools requiring minimal technical expertise also indicates that perceived ease of use—the second core TAM construct—was shaped not only by tool design but by the absence of institutional training support. In contexts where formal training was unavailable, ease of use became a survival strategy rather than a preference.

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Enhancement of Personalized and Differentiated Learning. AI tools enabled teachers to produce learning resources tailored to individual student levels, thereby facilitating differentiated instruction and more personalized interactions. Educators described using AI to generate multiple versions of the same lesson at different reading levels and to create customized visual schedules addressing individual student needs. However, teachers also observed that AI-generated materials frequently required modification, underscoring the continuing relevance of professional judgment in special education contexts.

"I can generate the same lesson at three different reading levels in minutes using AI tools." (Teacher 2)

"AI helps me create customized visual schedules for each student's needs." (Teacher 4)

"Though sometimes the materials need so much editing, it defeats the purpose of using AI." (Teacher 6)

These experiences align with Universal Design for Learning principles, which emphasize multiple means of representation, engagement, and expression (CAST, 2018). AI's capacity to generate varied content supports these principles by offering teachers efficient ways to address learner variability. Yet the necessity of editing AI outputs reveals a critical tension: while AI can produce differentiated materials, it cannot ensure their pedagogical or cultural appropriateness. This finding has significant implications for technological education management. When teachers spend substantial time modifying AI-generated content, the efficiency gains that motivated adoption are eroded. From an institutional perspective, this signals the need for investment in culturally adapted AI resources and training that develops teachers' critical evaluation skills. Personalization, in this view, is not merely a technical capability of AI but an institutional commitment that requires ongoing support. Schools that treat AI as a turnkey solution misunderstand the nature of special education, where professional judgment is irreplaceable. The finding also challenges the assumption that AI reduces teacher workload uniformly; instead, workload may be redistributed from content creation to content evaluation and adaptation. Effective management of AI integration requires recognizing this redistribution and allocating time accordingly.

Task Automation for Efficiency. Teachers reported that AI simplified time-intensive tasks such as preparing worksheets, generating quizzes, and drafting lesson plans, thereby enabling greater focus on direct instruction and student interaction. This automation reduced preparation time and decreased cognitive load, allowing teachers to devote more attention to individualized support. Nevertheless, educators emphasized that automation must be accompanied by active review and personalization to prevent errors or the use of mismatched materials.

"AI helps me generate worksheets and quizzes quickly, giving me more time for direct instruction." (Teacher 1)

"Automated lesson planning tools reduce my preparation time significantly." (Teacher 8)

These findings position AI as a capacity multiplier rather than a teacher substitute—a distinction central to the concept of augmented intelligence. Augmented intelligence frameworks emphasize that technology enhances human expertise by automating routine tasks while preserving professional decision-making for complex judgments (Harkins-Brown et al., 2025). In special education contexts, where instructional decisions carry significant consequences for vulnerable learners, this distinction is particularly critical. Teachers' insistence on reviewing and modifying automated outputs reflects their professional responsibility to determine what is appropriate for their students. From a technological education management perspective, protecting this judgment requires deliberate institutional choices. When schools adopt AI tools, they must simultaneously adopt policies that position teachers as decision-makers rather than passive technology recipients. Professional development should focus not only on how to use AI but on how to evaluate, critique, and adapt its outputs. The efficiency gains teachers celebrated were contingent on their ability to maintain oversight; when oversight was compromised by time pressures or lack of training, automation became a source of frustration rather than liberation.

Collectively, these findings demonstrate that AI tools function effectively in SPED classrooms when they serve as extensions of teacher expertise rather than autonomous substitutes. Three interconnected factors shape successful integration: individual teacher perceptions of usefulness and ease of use (TAM); pedagogical alignment with UDL principles for inclusive education; and critically, institutional conditions—such as resource allocation, training, and policy—that mediate sustained practice. From a socio-technical perspective, integration falters when technical components (tools,

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connectivity) are misaligned with social components (skills, culture, support) (Srivastava & Dixit, 2023). The results further suggest AI's core value lies in augmenting professional capacity, not replacement; teachers used AI to reach more students and differentiate more effectively. For educational leaders, this implies that investment in AI must be matched by investment in teacher development. Furthermore, the need for substantial modification of AI outputs highlights issues of cultural relevance and infrastructural adequacy, underscoring that AI tools developed for Western contexts cannot be simply transplanted. Ultimately, realizing AI's promise in special education depends on treating integration as an organizational transformation process, not a technological transaction.

Ambivalent Experiences: Empowerment and Frustration

The experiences of teachers with AI were characterized by deep ambivalence, simultaneously marked by feelings of empowerment and significant frustration. Although AI tools offered time-saving advantages and increased instructional flexibility, technical constraints, content suitability issues, and concerns about excessive reliance created persistent tensions. These ambivalent emotions reflect the inherent challenges of introducing technology into special education classrooms, where educators must constantly balance efficiency gains with the need for human mediation. This emotional complexity underscores that AI integration is not merely a technical process but a deeply psychological and experiential one, shaped by teachers' professional identities, values, and working conditions.

Excitement and Liberation through Time-Saving. Teachers reported feeling excited and relieved by AI's capacity to reduce workload and free time for direct student engagement. The ability to rapidly generate materials gave teachers a sense of regaining control over their time—a particularly significant benefit in special education, where individual preparation is labor-intensive. These moments of efficiency translated into professional satisfaction and renewed motivation, with AI perceived as facilitating rather than constraining teaching practice.

"AI has cut my material preparation time in half, allowing me to focus on individual students." (Teacher 9)

"When my student with dyslexia finally read independently using text-to-speech, it was magical." (Teacher 2)

These experiences reflect the Technology Acceptance Model's emphasis on perceived usefulness as a driver of adoption (Davis, 1989). When AI reduces routine workload, teachers can redirect effort toward meaningful student interaction, enhancing their sense of professional effectiveness. This finding has significant implications for technological education management: teacher workload management is a strategic concern, not merely an individual issue. Schools facing high burnout rates and teacher attrition may find that AI, when properly implemented, supports sustainable teaching practice by alleviating the excessive demands that drive educators from the profession. The emotional gratification teachers described is therefore not incidental but central to understanding AI's potential contribution to workforce stability and professional well-being. However, this empowerment is conditional upon tool accessibility and operability; when teachers must struggle with unreliable technology, agency is undermined rather than enhanced.

Frustration with Technical and Contextual Limitations. Alongside positive experiences, teachers expressed profound frustration with unreliable infrastructure and AI outputs that failed to align with classroom realities. Technical disruptions undermined lesson plans and eroded trust in AI-based activities. Perhaps more significantly, teachers consistently reported that AI-generated content did not match local cultural contexts, requiring extensive rewriting that negated time-saving benefits.

"The internet connection is so unreliable that I've stopped planning AI-based lessons." (Teacher 5)

"AI-generated content often doesn't match our cultural context and requires complete rewriting." (Teacher 7)

These frustrations reveal that AI adoption is shaped by systemic disparities in technological infrastructure, consistent with research on technology implementation in resource-constrained environments (Turyasingura et al., 2024). When teachers report abandoning AI-based lessons due to unreliable connectivity, they are not expressing personal resistance but responding to systemic failures that lie beyond their control. The cultural mismatch between AI outputs and local contexts further compounds this inequality. AI tools developed in Western settings, trained on Western datasets, and designed for well-resourced schools cannot simply be transplanted and expected to function appropriately. Teachers' experiences of extensive rewriting reflect the limitations of generic technologies in culturally specific educational environments.





Within the Technology Acceptance Model framework, these barriers directly reduce perceived ease of use, undermining sustained adoption regardless of perceived usefulness (Davis, 1989). However, from a management perspective, the solution cannot be merely training teachers to cope with poor infrastructure or culturally inappropriate content. Instead, these findings call for systemic attention to digital infrastructure investment and the development of locally relevant AI resources. Innovation without infrastructure leads not to transformation but to fragmented, inconsistent implementation that frustrates teachers and wastes resources. The frustration teachers described is therefore not an implementation hurdle to be overcome through individual effort but a symptom of organizational and policy-level failures that require institutional responses.

Fear of Dehumanization and Overdependence. Teachers voiced concerns that overreliance on AI might diminish the humanistic quality of special education instruction. They worried that technology could erode the emotional bonds, compassion, and personalized knowledge that define effective teaching for learners with special needs. Teachers stressed that AI lacks the capacity to interpret emotions and behavior—capabilities central to relational pedagogy in special education contexts.

"I worry that we're becoming too dependent on technology and losing the human touch in teaching." (Teacher 4)

"AI can't understand the unique emotional needs of my special students." (Teacher 10)

These concerns align with literature emphasizing that in SPED classrooms, emotional attune and relational pedagogy cannot be substituted (Ramaiah et al., 2024). Teachers recognize that special education is fundamentally relational built on trust, attunement, and responsive interaction that AI can support but not replace. When teachers accept AI, they do so conditionally, based on whether it supports rather than supplants these relational foundations.

This finding represents a core theoretical contribution of the study: while much AI discourse focuses on technical capability and efficiency, teachers' experiences reveal that acceptance depends on perceived alignment with humanistic values. AI is welcomed when it handles routine tasks, freeing teachers for meaningful interaction, but resisted when it threatens to intrude upon the relational work that defines special education. From a management perspective, this implies that AI integration strategies must explicitly address teachers' ethical concerns rather than dismiss them as resistance, and that professional development should include opportunities to discuss boundaries of appropriate use while institutional policies articulate a vision of technology that supports human connection. The key to successful implementation lies in maintaining balance between innovation and human reasoning (Harkins-Brown et al., 2025). For special education, AI works best when it supplements rather than substitutes for the relational essence of teaching—a finding with significant implications for how schools select, introduce, and govern AI tools, underscoring that emotional and ethical dimensions are not peripheral to technology adoption but central to its success or failure.

Socio-Technical and Infrastructural Barriers

Teachers consistently identified socio-technical and infrastructural factors as primary barriers to successful AI implementation in SPED classrooms. While individual readiness to use AI was evident, systemic constraints profoundly influenced whether and how teachers could meaningfully utilize these tools. Connectivity issues, device shortages, training deficits, and ethical concerns all shaped teachers' experiences. These difficulties demonstrate that AI integration is not solely a pedagogical concern but fundamentally an institutional and structural one, with external conditions mediating classroom-level innovation in ways that individual effort alone cannot overcome.

Unreliable Internet Connectivity and Lack of Devices. Teachers repeatedly cited limited device access and unreliable internet connectivity as insurmountable obstacles to AI implementation. Shared equipment and intermittent connections disrupted both lesson planning and real-time classroom application. These constraints forced educators to abandon or reduce AI-related activities even when they recognized potential benefits. The insufficiency of technological infrastructure undermined consistency and dependability, reducing AI from a reliable instructional tool to a situational option that could not be counted upon.

"We have one computer shared among five teachers – how can we effectively use AI?" (Teacher 3)

"Internet connectivity is our biggest challenge in implementing any technology." (Teacher 6)

These accounts illustrate a fundamental principle of socio-technical systems theory: technology integration requires alignment between technical components (hardware, software, connectivity) and

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social components (people, skills, practices, culture) (Srivastava & Dixit, 2023). When technical infrastructure is inadequate, even highly motivated teachers with positive attitudes toward AI cannot achieve sustained integration. The system becomes unstable because one essential element—reliable access—is missing. Research consistently confirms that insufficient hardware and connectivity hinder digital innovation in schools (Srivastava & Dixit, 2023). However, from a socio-technical perspective, the problem is not merely resource scarcity but misalignment: schools may acquire AI tools without simultaneously ensuring the infrastructure required to use them, creating a gap between technological investment and actual classroom capability. This misalignment strengthens existing disparities, particularly in special education where consistency and predictability are essential for learner progress. Teachers cannot plan instruction around tools that may or may not function on any given day. Institutional investment in infrastructure is therefore not optional but foundational precondition for any meaningful AI integration rather than an enhancement to be pursued after tool adoption.

Lack of Specialized Training and Technical Proficiency. Teachers reported minimal formal training, leaving them unprepared to confidently apply AI tools in their specific SPED contexts. Most relied on self-directed learning, trial and error, or informal peer support—methods that proved insufficient for developing deep pedagogical understanding of AI applications. This absence of systematic training heightened anxiety and reduced productivity, particularly among educators with less technological confidence. Teachers emphasized that generic technology workshops failed to address the unique demands of special education instruction.

"I learned to use AI through trial and error because there's no formal training available." (Teacher 1)

"The learning curve is steep for teachers who aren't tech-savvy." (Teacher 8)

These findings demonstrate that effective AI integration requires more than basic operational skills; teachers need pedagogical knowledge about adapting tools for diverse learners and critical evaluation skills to assess AI-generated content—competencies that generic training fails to provide (Bekdemir, 2024). From a technological education management perspective, this finding positions professional development not as optional support but as strategic investment. When schools introduce AI tools without corresponding investment in teacher capacity building, they effectively ensure underutilization. Teachers cannot be expected to integrate tools they do not understand or feel confident using. The anxiety and reduced productivity teachers reported are predictable consequences of organizational failure to provide adequate learning opportunities. Research confirms that lack of training reduces perceived ease of use, undermining sustained adoption regardless of perceived usefulness (Bekdemir, 2024). However, the solution is not merely more training but training that is context-specific, ongoing, and aligned with the pedagogical realities of special education. Generic workshops cannot address the specialized demands of adapting AI for learners with disabilities; professional development must be designed with SPED's unique requirements in mind.

Concerns over Data Privacy and Cultural Appropriateness. Teachers expressed significant distress over ethical dimensions of AI use, particularly regarding student data protection and cultural sensitivity. Privacy concerns arose from uncertainty about how student information was stored and handled by AI systems. Additionally, teachers observed that AI-generated materials consistently reflected Western-centric perspectives that did not align with local cultural contexts. These concerns raised fundamental questions about AI's suitability in sensitive SPED settings, creating ethical doubt that inhibited full utilization.

"I'm uncomfortable inputting student data into AI systems without clear privacy guidelines." (Teacher 2)

"The Western-centric content often doesn't resonate with our local experiences." (Teacher 5)

These ethical concerns extend beyond individual teacher discomfort to implicate institutional governance and regulatory policy. From a governance perspective, responsible AI adoption requires clear frameworks for data protection, privacy, and content appropriateness—frameworks that were evidently absent in participants' contexts. Research indicates that ambiguous data governance and cultural incompatibility erode trust in AI systems (Scott et al., 2024). In special education, where learners are particularly vulnerable and student information includes sensitive diagnostic and behavioral data, the stakes of inadequate governance are especially high. Teachers' reluctance to input student data reflects not resistance to technology but prudent caution in the absence of institutional assurance. When





schools fail to provide clear privacy guidelines, they transfer ethical risk to individual teachers, who must make difficult judgments without organizational support.

Similarly, cultural mismatch between AI outputs and local contexts represents not merely an inconvenience but a fundamental challenge to educational appropriateness. AI tools developed in Western settings, trained on Western datasets, and optimized for Western educational systems cannot simply be deployed elsewhere and expected to work. Teachers' reports of extensive rewriting reflect the gap between generic AI outputs and the culturally specific realities of Philippine classrooms. This finding implicates not only tool selection but broader questions about who develops AI educational resources and for whom. From a management perspective, addressing cultural appropriateness requires institutional attention to content localization, potentially including investment in locally developed AI resources or partnerships with developers willing to adapt tools for diverse contexts.

Applying socio-technical systems theory reveals that the barriers teachers described are interconnected elements of a misaligned system, where technical infrastructure, human capacity, and governance structures exist in dynamic relationship. When any element is deficient, the entire system's functionality is compromised. Teachers experienced this misalignment as frustration and ethical uncertainty—not because they lacked willingness to innovate but because they worked within systems that failed to support innovation. Even teachers with positive attitudes found their efforts undermined by infrastructural deficits, training gaps, and governance ambiguities, demonstrating that AI integration cannot be achieved through individual effort alone. This finding aligns with research indicating that effective innovation requires institutional preparedness alongside pedagogical will (Zavodna et al., 2024). From a management perspective, addressing barriers requires systemic intervention: schools must invest in infrastructure, design context-specific professional development, and establish clear governance frameworks. Without these institutional responses, AI adoption will remain fragmented and inequitable perpetuating rather than reducing educational disparities.

Necessary Support Systems for Effective Integration

Teachers emphasized that meaningful AI integration requires comprehensive support systems rather than merely access to tools. They identified professional training, adequate resources, and collaborative structures as essential conditions for sustained, effective use. In the absence of such support, AI implementation remained disjointed and dependent on individual teacher initiative—a pattern that is neither scalable nor sustainable. These findings support systems not as optional enhancements but as foundational conditions that enable teacher confidence, competence, and long-term engagement with AI.

Need for Specialized, Hands-On Training. Teachers consistently stressed the importance of training programs specifically designed for special education contexts. Generic ICT workshops failed to address the instructional realities of teaching learners with diverse disabilities. Participants advocated practical demonstrations and job-embedded training rather than theoretical presentations, believing that focused, relevant professional development would increase confidence and reduce the trial-and-error learning that currently characterized their AI use.

"We need SPED-specific AI training, not generic technology workshops." (Teacher 7)

"Step-by-step training with practical examples would be most helpful." (Teacher 4)

These findings can be interpreted through a change management lens, which positions professional development as a strategic intervention rather than an administrative formality. Successful innovation requires not only introducing new tools but systematically building the capacity of individuals to use them effectively. Research demonstrates that sustainable adoption depends on ongoing, context-sensitive professional learning rather than one-time training events (Bekdemir, 2024). Teachers' demand for SPED-specific training reflects recognition that generic approaches cannot develop the specialized knowledge required to adapt AI for diverse learners. From this perspective, professional development must address not only technical operation but pedagogical application, ethical judgment, and critical evaluation—competencies that generic workshops typically overlook. The trial-and-error approach teachers described is not simply inefficient but symptomatic of organizations that introduce innovation without investing in the learning required to implement it. For school leaders, this implies that professional development budgets must be allocated not as discretionary expenses but as core investments in implementation success.

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Requirement for Stable Infrastructure and Resources. Teachers identified reliable internet connectivity, adequate devices, and sustained maintenance funding as non-negotiable conditions for AI integration. They observed that even well-trained teachers cannot maintain AI use without these foundational resources. Budget constraints curtailed technology upgrades and maintenance, directly impacting the consistency and dependability of AI implementation.

"Reliable internet and adequate devices are non-negotiable for AI integration." (Teacher 9)

"We need a dedicated budget for maintaining and updating technology." (Teacher 3)

These infrastructure requirements must be understood within a framework of strategic budgeting and long-term policy planning. From a technological education management perspective, AI integration is not a one-time purchase but an ongoing financial commitment that encompasses hardware acquisition, connectivity costs, software subscriptions, maintenance, and periodic upgrades (Srivastava & Dixit, 2023). Teachers' calls for dedicated budgets reflect their recognition that ad hoc, project-based funding cannot sustain the continuous access AI tools require. Research confirms that successful digital transformation in schools is highly predicted by the availability of stable, recurring resources (Srivastava & Dixit, 2023). In special education contexts, where instructional consistency is particularly critical, infrastructure gaps produce not merely inconvenience but disruption of learning for vulnerable students. The implication for institutional governance is clear: AI integration requires integration into school improvement plans and budget cycles, not treatment as an experimental add-on. Without strategic financial planning, AI adoption will remain fragmented and inequitable, with well-resourced schools advancing while under-resourced schools fall further behind—perpetuating rather than reducing educational disparities.

Establishment of Communities of Practice and Mentorship. Teachers emphasized the value of collaboration, mentorship, and shared learning spaces for sustaining AI integration. They expressed desire for forums where educators could exchange successful strategies, troubleshoot challenges, and learn from peers. Mentorship between technologically skilled and experienced teachers was identified as particularly valuable, providing both technical guidance and emotional support. These communities reduced the isolation of individual experimentation and encouraged collective problem-solving.

"A sharing platform where teachers exchange successful AI strategies would be valuable." (Teacher 2)

"Mentorship between tech-savvy and experienced teachers would help everyone." (Teacher 6)

Teachers' desire for collaboration reflects understanding that AI integration is too complex to be navigated alone; collective learning accelerates adoption and provides contextually relevant solutions that formal training cannot supply. Research confirms that collaborative professional cultures facilitate innovation and didactical coherence (Silva & Trindade, 2024). In technological education management, peer learning networks are recognized as key drivers of sustainable innovation because they enable knowledge construction, reduce resistance through peer support, and create collective ownership of change processes.

The mentorship dynamic teachers described is particularly significant. When technologically proficient teachers support experienced colleagues, knowledge transfer occurs within trusted relationships, reducing anxiety and building confidence. This peer-to-peer learning model addresses the affective dimensions of change—fear, uncertainty, self-doubt—that formal training often ignores. From a change management perspective, communities of practice function as informal drivers of innovation diffusion, supplementing formal professional development with ongoing, situated learning. For school leaders, this implies that creating time and space for teacher collaboration is not peripheral to AI integration but central to its success. Structured opportunities for peer learning, whether through professional learning communities, mentorship programs, or digital sharing platforms, should be deliberately designed and resourced.

Viewed through the lens of educational change theory, teachers' articulated support needs—specialized training, stable infrastructure, and collaborative communities—constitute the essential and interdependent pillars of successful innovation implementation. Teachers' insistence that tool access alone is insufficient reflects their sophisticated understanding that sustainable integration requires parallel investment in people, resources, and relationships. Their experiences confirm that AI adoption is fundamentally an organizational and collective process requiring institutional preparedness alongside pedagogical will (Bekdemir, 2024; Zavodna et al., 2024). For educational leaders and policymakers,





the implication is clear: realizing AI's potential in special education demands systemic commitment to creating conditions where teachers can succeed. Without this commitment, AI tools will remain underutilized, frustration will persist, and the promise of more inclusive, responsive education will go unfulfilled.

Discussion

This study explored the lived experiences of special education teachers utilizing AI tools, revealing that AI integration is not merely a technical implementation but a socio-technical process involving interaction between people, technology, policy, and institutional culture. Teachers expressed willingness to adopt AI, yet systemic gaps in infrastructure, training, and governance consistently undermined sustainability. These findings affirm that successful AI integration requires alignment across individual capacity, institutional readiness, and ethical frameworks.

The most commonly used AI tools—ChatGPT, text-to-speech apps, grammar checkers, and AI-assisted lesson generators—reflect the Technology Acceptance Model's emphasis on perceived usefulness and ease of use as drivers of adoption (Davis, 1989). However, extending beyond individual perception, these findings demonstrate that perceived usefulness is itself shaped by institutional conditions. When infrastructure is reliable and training available, teachers perceive tools as more useful; when these conditions are absent, even useful tools remain underutilized (Srivastava & Dixit, 2023). By enabling personalized learning and increasing access for students with disabilities, AI tools contribute to inclusive education policy goals, positioning AI integration as integral to broader digital transformation strategies (Ahmad et al., 2024; Harkins-Brown et al., 2025).

Teachers described AI as both empowering and demanding. Time saved on preparation enabled greater focus on direct student interaction, increasing professional fulfillment. This empowerment was conditional upon teachers' ability to critically review and adapt AI-generated content, preserving their authority while leveraging technological efficiency. This balance reflects augmented intelligence, where technology enhances rather than replaces human expertise (Harkins-Brown et al., 2025). Teachers welcomed AI when it supported their practice but resisted it when it threatened relational work, underscoring that acceptance depends on alignment with professional values—an extension of TAM that introduces ethical and relational dimensions (CAST, 2018).

Despite positive attitudes, significant barriers limited implementation. Poor internet connectivity and inadequate device access disrupted instruction and eroded confidence, directly reducing perceived ease of use (Davis, 1989). These findings reveal digital inequality: innovation without infrastructure leads to fragmented implementation that frustrates teachers and wastes resources (Turyasingura et al., 2024). From a management perspective, digital equity is a prerequisite for meaningful AI integration, not an add-on.

The absence of SPED-specific training compounded these deficits. Teachers relied on trial-and-error learning, insufficient for developing the specialized knowledge required to adapt AI for diverse learners. Effective AI integration requires pedagogical, ethical, and critical competencies beyond technical skills—precisely what generic workshops fail to provide (Bekdemir, 2024). Professional development must therefore be context-specific, ongoing, and embedded in practice.

Teachers expressed concern about data privacy and cultural appropriateness, reflecting the absence of clear institutional guidelines. Uncertainty about how student information was handled created reluctance to input data, while culturally inappropriate content required extensive rewriting. These concerns implicate governance and leadership: ambiguous data governance erodes trust, particularly in special education where learners are vulnerable (Scott et al., 2024). Responsible AI adoption requires clear policy frameworks addressing data protection and cultural relevance.

Teachers strongly emphasized the importance of communities of practice and mentorship. Their desire for sharing platforms reflects recognition that AI adoption is too complex to be navigated alone; collective learning provides contextually relevant solutions that formal training cannot supply (Silva & Trindade, 2024). From an organizational change perspective, collaborative cultures facilitate innovation by reducing resistance and creating collective ownership. Creating time and space for collaboration is central to integration success.





In synthesis, effective AI integration in SPED requires alignment across three interconnected dimensions: individual teacher expertise (augmented by AI), institutional support (infrastructure, training, collaboration), and ethical governance (policy, privacy, cultural adaptation). When aligned, AI enhances inclusive education; when any dimension is deficient, the entire system is compromised (Zavodna et al., 2024). This model extends individual-focused technology acceptance frameworks to account for organizational and governance variables.

In conclusion, AI tools offer significant potential to enhance special education, but realizing this potential depends on treating integration as an organizational transformation process requiring systemic commitment. Without parallel investment in people, resources, and governance, AI adoption will remain fragmented and inequitable perpetuating rather than reducing educational disparities.

Conclusion

This study has shown that AI integration in special education is in fact a socio-technical process that needs alignment on three dimensions that are interdependent: the teacher expertise, institutional preparedness, and the ethical governance. Although AI tools can make the process more efficient and facilitate differentiated instruction, which is in line with the principles of the Universal Design of Learning (because it allows using multiple means of representation and expression), their effective use requires more than the efforts put in by individual teachers. The teachers feel empowered as AI supports their professional judgment and allows them to spend time engaging with students in meaningful ways, but the empowerment is compromised by lack of infrastructural support, proper training, and lack of ethical standards. These results are an extension of the Technology Acceptance Model with the results indicating that perceived usefulness and ease of use is influenced not just by individual perception, but also organizational elements such as quality of infrastructure, policy comprehensibility, and professional development. Technologically education management-wise, to ensure sustainable adoption of AI, the strategic leadership approach is needed to integrate the technology into institutional planning as opposed to single-subject innovation. Schools need to commit to SPED-specific training, sound infrastructure, professional culture of cooperation, and effective data governance models. Finally, AI is no replacement for teachers, it is an addition to their ability, which will only manifest itself when teacher mediation, systemic support, and ethical responsibility can work in concert. Further investigation of this alignment model should be done by obtaining larger and more diverse samples in various institutional settings in the future.

Knowledge Contribution

Figure 2 presents the contribution of the study, which shows the interaction between three main areas (teacher-mediated integration, human-centered insights, and systemic support) and how their combination is what leads to the emergence of effective AI application in SPED classrooms. The primary mediators are teachers who use AI to improve differentiated instruction, accessibility, and efficiency of tasks and make professional judgment. This proves that AI should be used as a helper tool that supports the knowledge of teachers and not to substitute it. It is emphasized in the diagram that the success of AI is based not only on the tools themselves but also on the application and adaptation of the tools by teachers to the needs of learners.

This also highlights that human and institutional aspects are relevant in the adoption of AI. The results of the experience of teachers in terms of empowerment, frustration, and ethical issues indicate the necessity to strike a balance between technological efficiency and relational pedagogy. The institutional support such as training, infrastructure, and guidelines contributes to enhancing the capabilities of teachers to utilize AI successfully and in a sustainable manner. Combined, these three areas constitute a dynamic system with teacher knowledge, human-centered thinking, and organizational preparedness meeting to aid in the fact that AI implementation is valuable, context-specific, and improves inclusive teaching methods.



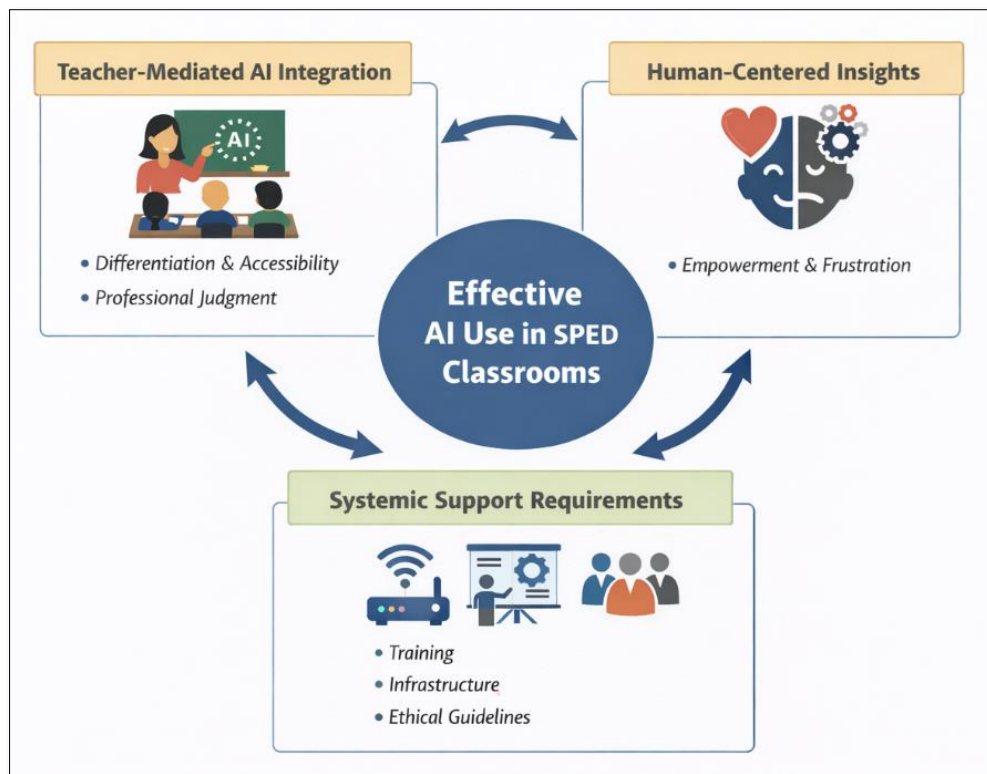


Figure 2. Knowledge Contribution of the Study

Recommendation

1. **Provide SPED-Specific AI Training** – Schools should offer hands-on training focused on the needs of special education teachers, including lesson adaptation, text-to-speech tools, and AI-assisted planning.
2. **Ensure Stable Infrastructure** – Reliable internet, sufficient devices, and technical support should be made available to allow consistent and uninterrupted use of AI in classrooms.
3. **Develop Ethical Guidelines** – Schools and authorities should create clear policies for data privacy, cultural relevance, and responsible AI use to protect learners and guide teachers.
4. **Establish Communities of Practice** – Encourage mentorship, collaboration, and sharing of best practices among SPED teachers to support collective learning and problem-solving.
5. **Integrate AI Thoughtfully** – Teachers should use AI as a complementary tool rather than a replacement, maintaining professional judgment and adapting outputs to meet individual learner needs.

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