ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

Examining Information Technology Support for Children with Special Educational Needs in Under-Resourced Communities

Mohammad Abdul Salam[1]; Abbas Toure[2]; Richard Manprisio[3]; Samreen Unnisa[4]

[1,2,3,4]Department of Information Technology (DSMT), College of Arts and Sciences
Governors State University
University Park, IL, USA

Publication Date: 2025/12/05

Abstract: Children with Special Educational Needs (SEN) in under-resourced communities face significant barriers to accessing quality education. While information Technology (IT) offers promising solutions through assistive devices, educational software, and adaptive platforms, implementation in low-resource settings remains challenging. This mixed-methods study integrates a systematic literature review with qualitative case study analysis to examine how assistive technologies can support SEN children in under-resourced contexts. Drawing on the Social Model of Disability and the Technology Acceptance Model, the research identifies current technologies in use, analyzes multidimensional barriers to implementation, examines impacts on learning and inclusion, and proposes evidence-based strategies for sustainable integration. Four diverse case studies, from the UK, India, South Korea, and the USA, provide rich contextual insights that complement the systematic review's broader synthesis. Findings reveal that while assistive technologies demonstrate significant potential, effectiveness depends critically on addressing infrastructure deficits, economic constraints, teacher preparation gaps, cultural appropriateness, and policy frameworks. The study contributes actionable knowledge for policymakers, practitioners, and researchers working to advance inclusive education through Technology in resource-constrained settings.

Keywords: *Special Educational Needs, assistive Technology, under-resourced communities, Social Model of Disability, Technology Acceptance Model.*

How to Cite: Mohammad Abdul Salam; Abbas Toure; Richard Manprisio; Samreen Unnisa (2025) Examining Information Technology Support for Children with Special Educational Needs in Under-Resourced Communities. *International Journal of Innovative Science and Research Technology*, 10(11), 2534-2545. https://doi.org/10.38124/ijisrt/25nov1567

I. INTRODUCTION

Children with Special Educational Needs (SEN) face complex and interconnected barriers to accessing quality education—barriers that intensify considerably in under-resourced communities. These contexts are typically characterized by inadequate educational infrastructure, a scarcity of specialized support services, and pervasive socio-economic constraints [72]. Such conditions frequently lead to educational marginalization and suboptimal learning outcomes for SEN children, thereby reinforcing intergenerational cycles of disadvantage [55]. The challenges are particularly acute for children with diverse disabilities, including autism spectrum disorder, learning disabilities, physical disabilities, and hearing impairments, each requiring specialized interventions and support mechanisms that are often unavailable in low-resource settings ([13]; [67]).

In recent years, information Technology (IT) has emerged as a potentially transformative intervention, offering tailored applications, software platforms, and assistive devices designed to enhance learning, facilitate communication, and promote social inclusion among SEN children ([37]; [40]). The landscape of assistive Technology has expanded dramatically, encompassing a wide range of tools from augmentative and alternative communication (AAC) applications such as [5] to comprehensive learning platforms like [2] and [21]. These technologies address various educational needs: communication apps support non-verbal children ([22]), educational games enhance engagement and skill development [24], and specialized tools like speech and language resources provide targeted interventions for specific disabilities [68].

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

The integration of IT in educational settings is particularly promising in under-resourced environments, where conventional support mechanisms are often absent, insufficient, or ineffective. Emerging research demonstrates that assistive technologies can significantly improve learning outcomes when properly implemented. For instance, AI-enabled personalized assistive tools have shown potential to enhance education for disabled persons, though legal and ethical considerations remain ([7]; [19]). Studies from diverse contexts, including Bangladesh [32], Pakistan [35], Kenya [39], Ghana [58], and the Philippines [12], reveal both the promise and challenges of implementing assistive technologies in resource-constrained settings. These technologies range from mobile learning applications [34] to AI-powered adaptive learning systems ([62]; [31]) and virtual reality environments for immersive learning experiences [44].

This study is grounded in two theoretical frameworks: the Social Model of Disability and the Technology Acceptance Model. The Social Model of Disability emphasizes the importance of addressing societal barriers that hinder the participation of individuals with disabilities, while the Technology Acceptance Model focuses on the factors that influence the adoption and use of Technology. Together, these frameworks provide a nuanced lens through which to examine the complexities of Technology implementation in diverse educational contexts. This framework is particularly relevant when considering the deployment of assistive technologies in under-resourced communities, where factors such as accessibility, affordability, cultural relevance, and user training significantly influence adoption and sustained use ([3]; [29]). Moreover, the Universal Design for Learning (UDL) framework provides pedagogical guidance for creating inclusive learning environments that accommodate diverse learner needs through flexible approaches to presentation, expression, and engagement [4] et al.

Contemporary advances in artificial intelligence have further expanded the potential of assistive technologies. AI-driven tools can provide personalized learning experiences tailored to individual student needs, adaptive assessments that adjust to learner performance, and intelligent tutoring systems that offer real-time feedback and support ([1]; [20]; [38]). Research indicates that AI-powered innovations are transforming adaptive education for disability support, enabling more responsive and individualized interventions ([61]; [66]). However, the effectiveness of these technologies depends critically on teacher preparedness and institutional capacity. Studies examining teacher experiences with AI-driven assistive technologies in special needs classrooms highlight the importance of professional development, technical support, and pedagogical integration strategies ([23]; [71]).

The realistic application of assistive technologies encompasses diverse domains. For children with autism, technologies range from apps that decode and support characteristic hand movements [53] to comprehensive assistive Technology packages that facilitate communication, social interaction, and academic learning ([10]; [27]). For students with learning disabilities, technologies include text-to-speech tools like WordTalk (n.d.), educational platforms such as BrainPOP (n.d.) that present content through multimedia formats, and specialized interventions documented in systematic reviews of effectiveness ([45]; [59]). The integration of these technologies in inclusive classrooms requires careful consideration of implementation strategies, ongoing support structures, and alignment with curriculum goals ([14]; [28]).

Despite these advances, significant implementation challenges persist. Research from multiple contexts identifies recurring barriers: inadequate infrastructure and internet connectivity, insufficient teacher training and professional development, lack of culturally and linguistically appropriate content, limited financial resources for Technology acquisition and maintenance, and weak policy frameworks to support inclusive education ([11]; [13]; [48]). These challenges are particularly pronounced in under-resourced communities where multiple deprivations intersect. Studies emphasize the need for context-specific strategies that address local constraints while leveraging available resources ([42]; [46]; [47]).

II. LITERATURE REVIEW

Assistive Technology for SEN children contains a diverse array of tools, devices, and software applications designed to support learning, communication, and participation. [17] provided an early comprehensive framework for understanding assistive Technology in educational contexts, categorizing tools by function. This foundational work established that effective assistive Technology integration requires matching tools to individual student needs, providing adequate training and support, and embedding Technology use within broader instructional strategies.

Present assistive technologies span multiple categories. Augmentative and Alternative Communication (AAC) systems support students with communication disabilities through symbol-based communication boards, speech-generating devices, and mobile applications. [5] represents a leading AAC application that combines picture-based communication with text-to-speech functionality, customizable vocabularies, and data tracking features. Research on AAC effectiveness demonstrates significant improvements in communication skills, social interaction, and behavioral outcomes for non-verbal children when tools are appropriately selected and consistently used [22].

Educational software platforms provide structured learning experiences across academic domains. ABCmouse.com (n.d.) offers a comprehensive early learning curriculum with over 10,000 activities spanning reading, mathematics, science, and art, utilizing game-based learning approaches to enhance engagement. Duolingo ABC (n.d.) focuses specifically on literacy development through interactive phonics instruction and reading practice. BrainPOP (n.d.) delivers curriculum-aligned content through animated videos, quizzes, and interactive activities designed to accommodate diverse learning styles. Education.com (n.d.) provides a vast library of educational games, worksheets, and lesson plans that teachers can adapt to individual student needs. Research indicates that well-designed educational software can

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

improve academic outcomes, particularly when integrated with explicit instruction and progress monitoring ([32]; [63]).

Assistive reading and writing tools address specific learning disabilities. Text-to-speech applications like WordTalk (n.d.) convert written text to audio, supporting students with dyslexia or visual impairments. Speech-to-text tools enable students with writing difficulties to compose text through dictation. Word prediction software reduces the cognitive and physical demands of writing by suggesting words as students type.

Specialized therapeutic and intervention tools target specific developmental needs. Speech and language applications provide structured practice in articulation, vocabulary, grammar, and pragmatic communication skills [68]. Apps designed for children with autism address social skills development, emotion recognition, behavioral self-regulation, and sensory processing [53]. Research demonstrates that Technology-mediated interventions can be highly effective when delivered with appropriate intensity, individualization, and generalization support ([10]; [27]).

Emerging technologies expand the boundaries of assistive Technology. Virtual reality (VR) environments create immersive learning experiences that can support social skills training, phobia reduction, and experiential learning for students with various disabilities [44]. Artificial intelligence enables adaptive learning systems that personalize content, pacing, and instructional approaches based on individual student performance and needs [62]. Robotics applications provide interactive learning companions and therapeutic tools for children with autism and other developmental disabilities [33].

Mobile technologies have particular significance for under-resourced contexts. [34] argue that mobile devices can serve as viable alternatives to specialized assistive Technology devices, offering lower costs, greater portability, and access to diverse applications. Their research in Moroccan schools demonstrated that tablets loaded with appropriate apps could effectively support students with various disabilities when teachers received adequate training and ongoing support. This finding has important implications for resource-constrained settings where purchasing dedicated assistive devices may be prohibitive.

A. Effectiveness and Impact on Learning Outcomes

A substantial body of research examines the effectiveness of assistive technologies in improving educational outcomes for SEN children. [45] conducted a comprehensive review of research-based studies on assistive Technology effectiveness, concluding that technologies can significantly enhance learning outcomes when properly matched to student needs, integrated into instructional practice, and supported by adequate training and resources. Their review identified several factors associated with positive outcomes: individualized assessment and Technology selection, explicit instruction in Technology use, consistent implementation across settings, and ongoing monitoring and adjustment.

More recent research confirms and extends these findings across diverse contexts and technologies. [58] examined the effects of assistive Technology and training on academic performance among college students with physical disabilities in Ghana, finding significant improvements in academic achievement, study efficiency, and self-reported confidence. Critically, their study demonstrated that Technology provision alone was insufficient; training in effective Technology use was essential for realizing benefits. This finding underscores the importance of comprehensive implementation approaches that address both Technology access and user capacity.

Research on specific disability categories reveals differential patterns of effectiveness. For students with learning disabilities, assistive reading and writing technologies demonstrate consistent positive effects on academic performance and engagement. [59] reviewed interventions for adolescents and adults with learning disabilities, finding strong evidence for text-to-speech, speech-to-text, and organizational software in improving reading comprehension, written expression, and academic productivity. However, they noted that effectiveness varied considerably based on individual characteristics, technological features, and implementation quality, emphasizing the need for individualized assessment and selection.

For children with autism spectrum disorder, research indicates that assistive technologies can support multiple developmental domains. [10] reviewed innovations in assistive Technology for autism in Brazilian educational contexts, identifying effective applications for communication development, social skills training, behavioral regulation, and academic learning. [27] similarly documented positive outcomes across communication, social interaction, and educational engagement when technologies were selected to match individual profiles and integrated within comprehensive intervention programs. However, both studies noted significant variability in outcomes and emphasized that Technology should complement rather than replace human-mediated instruction and interaction.

Studies examining AI-powered adaptive learning systems report promising but mixed results. [62] investigated the impact of adaptive AI learning systems on students with learning disabilities, finding improvements in engagement, personalized learning experiences, and some academic outcomes. However, the study also identified challenges related to algorithm accuracy, cultural bias in content, and the need for teacher oversight to ensure appropriate adaptations. [38] similarly found that AI-enhanced special education tools could improve learning outcomes but required careful implementation, ongoing monitoring, and integration with teacher expertise rather than replacement of human judgment.

Research from under-resourced contexts provides important insights into effectiveness under constrained conditions. [32] examined technological advancements in special education in Bangladesh, documenting improvements in learning outcomes, school attendance, and family satisfaction when assistive technologies were implemented

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

with community support and teacher training. However, the study noted that sustainability remained challenging due to limited resources for device maintenance, software updates, and ongoing professional development. [35] reported similar findings from Pakistan, where assistive Technology interventions showed positive effects on educational engagement and achievement but faced significant barriers related to infrastructure, funding, and systemic support.

A. Barriers to Implementation in Under-Resourced Contexts

A critical theme in the literature concerns the substantial barriers to effective assistive Technology implementation in under-resourced communities. Research consistently identifies multiple, intersecting obstacles that limit technological access, adoption, and sustained use.

Infrastructure and connectivity challenges represent fundamental barriers. [54] conducted a systematic review of Technology use in special education, identifying inadequate infrastructure, including unreliable electricity, limited internet connectivity, and insufficient technical support, as primary obstacles to implementation, particularly in low- and middle-income countries. [39] documented similar challenges in Kenya, where efforts to implement AI-based assistive technologies for learners with physical disabilities were severely constrained by infrastructure deficits. Their design thinking approach emphasized the need for solutions adapted to local infrastructure realities, including offline functionality, low bandwidth requirements, and solar power compatibility.

Economic constraints limit both initial Technology acquisition and sustained use. [36] analyzed assistive Technology integration challenges, highlighting that cost barriers extend beyond device purchase to include software licenses, technical support, training, maintenance, and periodic upgrades. In under-resourced communities, these cumulative costs place assistive technologies beyond reach for many families and under-funded schools. [64] emphasized that ensuring equity and access for students with disabilities requires addressing not only initial costs but also the total cost of ownership, including hidden expenses that can render seemingly affordable technologies unsustainable.

Teacher preparation and professional development gaps undermine effective implementation. [12] investigated assistive Technology integration in the Philippines, finding that while teachers expressed positive attitudes toward Technology, many lacked adequate training in selection, implementation, and troubleshooting. This preparation gap resulted in underutilization of available technologies and missed opportunities for enhancing student learning. [63] similarly documented that Technology alone cannot compensate for inadequate teacher knowledge and skills; effective implementation requires sustained professional development that addresses both technical proficiency and pedagogical integration strategies.

[23] examined teacher experiences with AI-driven assistive technologies in special needs classrooms, revealing that teachers felt overwhelmed by rapidly evolving technologies, uncertain about appropriate applications, and insufficiently supported in developing implementation expertise. Teachers reported needing not only initial training but ongoing coaching, collaborative learning opportunities, and access to technical support to effectively integrate technologies into instructional practice. This finding aligns with broader research emphasizing that professional development must be sustained, practice-based, and supported by organizational structures rather than consisting of isolated workshop experiences [17].

Cultural and linguistic barriers limit the relevance and usability of assistive technologies in diverse contexts. [3] examined assistive Technology in Arabic-speaking countries, documenting significant challenges related to the predominance of English-language technologies, lack of culturally appropriate content, and insufficient adaptation to local educational practices and values. Many assistive technologies are developed for Western contexts and fail to account for linguistic diversity, cultural norms regarding disability, family structures, and educational expectations that vary across global contexts. [5] emphasized that inclusive education requires assistive technologies that reflect and respect cultural diversity rather than imposing homogeneous solutions.

Research from Latin American contexts reinforces these concerns. [48] investigated educational Technology for students with specific educational needs in Ecuador, finding that imported technologies often contained culturally irrelevant examples, images, and scenarios that limited student engagement and learning. Similarly, [11] recorded that effective use of Technology and AI for students with learning disorders required substantial adaptation of content, language, and instructional approaches to align with local contexts. These studies emphasize that Technology effectiveness depends not only on technical features but also on cultural appropriateness and local relevance.

Policy and institutional barriers create systemic obstacles to assistive Technology integration. [52] analyzed prospects for AI technologies in inclusive education, identifying weak policy frameworks, inadequate funding mechanisms, and limited coordination among educational stakeholders as critical barriers. Without clear policies mandating assistive Technology provision, establishing quality standards, allocating resources, and ensuring accountability, Technology adoption remains ad hoc and inequitable. [70] emphasized that management of AI as an assistive tool requires institutional frameworks that address procurement, implementation standards, professional development systems, and outcome monitoring, elements often absent in under-resourced educational systems.

[13] studied the role of Technology in educational inclusion for students with special needs, arguing that policy barriers extend beyond the absence of supportive regulations to include policies that inadvertently create obstacles, such as rigid curriculum requirements that limit individualization, assessment systems that fail to accommodate diverse learners, and funding formulas that do not adequately support special education needs. Addressing these systemic barriers requires comprehensive policy reform that positions inclusive education and assistive Technology as priorities rather than peripheral concerns.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

C. *Gaps in Existing Research*

Despite the growing body of literature on assistive Technology for SEN children, several significant gaps remain.

- First, research from under-resourced contexts, particularly low- and middle-income countries, remains limited. Many studies have been conducted in high-resource settings, limiting understanding of effectiveness and implementation challenges under constrained conditions [54].
- Second, long-term studies examining sustained effects and sustainability of assistive Technology interventions are rare. Most research involves short-term implementations, leaving questions about whether benefits persist over time and whether Technology use is sustained [45].
- Third, research examining the intersection of multiple barriers, infrastructure, economic, pedagogical, cultural, and institutional is limited. Most studies focus on single barrier categories rather than examining how multiple obstacles interact to shape implementation outcomes [41].
- Fourth, research on culturally responsive Technology design and implementation strategies appropriate for diverse contexts remains underdeveloped. While the importance of cultural appropriateness is increasingly recognized, specific guidance on achieving it is limited ([3]; [29]).
- Fifth, research on cost-effectiveness and sustainable financing models for assistive Technology in under-resourced settings is scarce. While cost is frequently cited as a barrier, rigorous analyses comparing costs and benefits of different technologies and implementation approaches are rare [36].
- Sixth, research examining student, family, and community perspectives on assistive Technology is limited, with most studies focusing on educator or researcher perspectives [13]. Understanding how students and families experience and value assistive technologies is essential for developing acceptable and effective interventions.
- Finally, research on scaling successful assistive Technology interventions from pilot projects to system-wide implementation is limited. Many studies document promising small-scale initiatives without addressing how such approaches could be scaled to reach all students who could benefit [70]. Addressing these research gaps is essential for developing evidence-based approaches to assistive technology integration that are effective, equitable, and sustainable in under-resourced contexts.

III. RESEARCH PROBLEM AND OBJECTIVES

Despite increasing advances in assistive technologies, children with Special Educational Needs (SEN) in under-resourced communities continue to face major obstacles that prevent these tools from improving their learning. Limited infrastructure, financial constraints, and gaps in teacher training make many technologies difficult to access or use meaningfully ([36]; [63]). Many tools are also culturally and linguistically misaligned with the realities of these communities, reducing their relevance and effectiveness ([3]; [50]). Weak policy support further leads to inconsistent and unsustainable implementation. Although assistive technologies have demonstrated strong potential to enhance communication, learning, and inclusion for SEN learners, this potential remains largely unrealized in low-resource settings. Understanding these barriers and identifying context-appropriate strategies is essential to ensuring equitable access and meaningful impact.

This study investigates how assistive technologies can meaningfully improve educational outcomes for children with Special Educational Needs (SEN) in low-resource settings by identifying the types of technologies currently in use, analyzing the barriers that shape their adoption, examining their impacts on learning and social inclusion, and proposing strategies to enhance equitable implementation.

This paper explores how information Technology can support children with Special Educational Needs (SEN) in under-resourced settings, focusing on the accessibility, affordability, and cultural relevance of technological solutions. It also examines the infrastructural, economic, pedagogical, and cultural factors that influence Technology adoption and effectiveness ([36]; [41]; [70]). It also draws on successful implementation models from diverse contexts—including initiatives by Samarthanam Trust in India, Forest School UK, Future Minds Academy in South Korea, and middle school programs in Texas, to highlight effective practices, common challenges, and strategies for sustainable integration. By synthesizing evidence from research, real-world case studies, and theoretical perspectives, the paper offers practical insights and actionable guidance for improving the use of assistive technologies in low-resource educational environments.

The systematic literature review (SLR) synthesizes existing research on IT applications, software, and assistive devices for SEN education, with particular focus on studies conducted in or relevant to under-resourced settings. The SLR serves multiple purposes: (1) mapping the landscape of assistive technologies documented in research literature, (2) identifying evidence regarding technology effectiveness and impact, (3) synthesizing documented barriers and facilitators to implementation, (4) analyzing contextual factors influencing outcomes, and (5) identifying gaps in existing research that justify the current study. The review provides a theoretical and empirical foundation for the case study component and enables comparison of case study findings with broader evidence patterns.

IV. THEORETICAL FRAMEWORK

This study is grounded in two complementary theoretical perspectives that provide a robust framework for understanding the adoption and impact of information Technology (IT) in supporting children with Special Educational Needs (SEN) in under-resourced communities. These frameworks address both the structural contexts and individual-level factors that shape Technology integration in inclusive education.

A. Social Model of Disability

The Social Model of Disability [55] serves as the foundational lens through which disability is conceptualized in this research. This model represents a paradigmatic shift from traditional medical or deficit-based understandings of disability, which locate the "problem" within the individual's impairment, to a social-environmental perspective that identifies disability as arising from the interaction between individual characteristics and societal barriers. [55] argues that

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

disability is not an inherent attribute of the person but rather a consequence of social, physical, attitudinal, and institutional obstacles that prevent full participation in society. In the context of education for SEN children in under-resourced communities, the Social Model directs analytical attention to the environmental and systemic factors that create or perpetuate educational exclusion. Rather than focusing solely on the child's impairment or learning difficulty, this perspective emphasizes the need to identify and dismantle barriers within the educational system, the physical environment, the curriculum, pedagogical practices, and societal attitudes [64].

Applying the Social Model to the study of assistive Technology adoption reveals that Technology itself is not a neutral solution but must be understood within the broader context of structural barriers and enablers. While assistive technologies hold potential to reduce barriers to learning and participation [41], their effectiveness depends fundamentally on addressing the environmental conditions that shape their accessibility, usability [50], and ultimately integration into educational practice.

B. Technology Acceptance Model

The Technology Acceptance Model (TAM), developed by [16], provides the second theoretical pillar for this study, focusing on the individual and organizational factors that influence technology adoption and use. The model posits that two primary cognitive beliefs shape an individual's intention to use a technology and, consequently, their actual usage behavior: perceived usefulness (the degree to which a person believes that using a particular technology will enhance their performance or achieve desired outcomes) and perceived ease of use (the degree to which a person believes that using the technology will be free from effort).

In the context of assistive technology adoption for SEN education, TAM provides a valuable lens for examining how educators, caregivers, and the children themselves evaluate and respond to technological interventions. Research applying TAM to educational technology contexts demonstrates that teachers' perceptions of usefulness and ease of use significantly predict their adoption and integration of digital tools into instructional practice ([29]; [36]). Utilizing TAM in under-resourced communities requires attention to contextual factors such as cultural relevance of technology content, alignment with local educational priorities and curriculum requirements, and observable evidence of effectiveness in similar contexts ([3]; [23]). According to [34], apparent ease of use is especially weighty when individuals have little prior experience with technology, limited opportunities for training or technical assistance [63], and are expected to work with systems designed for different linguistic and cultural contexts. Understanding how these external variables operate through perceived usefulness and ease of use to influence adoption provides actionable insights for designing interventions that enhance technology acceptance and sustained use ([30]; [31]).

C. Integration of Theoretical Frameworks l

Together, the Social Model of Disability and the Technology Acceptance Model provide complementary perspectives that enable a comprehensive examination of assistive technology adoption and impact in under-resourced communities. This integrated framework recognizes that successful technology integration requires both macro-level changes to remove societal barriers and micro-level interventions to support positive user perceptions and behaviors. From a Social Model perspective, even the most user-friendly and effective assistive technology will fail to achieve its potential if systemic barriers, such as lack of infrastructure, inadequate funding, weak policy support, or stigmatizing attitudes, prevent its deployment and use ([13]; [52]). Conversely, from a TAM perspective, even in contexts where structural barriers have been addressed, technology adoption will be limited if educators and caregivers do not perceive the technology as useful and easy to use, or if they lack the training and support needed to integrate it effectively into practice ([17]; [54]).

By combining the Social Model's emphasis on removing societal barriers with TAM's insights into user acceptance, the research seeks to identify strategies that are both structurally sound and practically viable, thereby enhancing the likelihood that assistive technologies can fulfill their promise of transforming educational opportunities for the most vulnerable children ([40]; [41]; [64]).

V. RESEARCH DESIGN AND METHODOLOGY

The authors of this study employ a convergent parallel mixed-methods design [15], as they integrated a systematic literature review with qualitative case study analysis. This design was selected for several compelling reasons. First, the complexity of assistive technology implementation in under-resourced contexts requires examining both the broader evidence base (through systematic review) and context-specific realities (through case studies). Second, the study's theoretical framework, combining macro-level structural analysis (Social Model) with micro-level user acceptance factors (TAM), calls for multiple methodological approaches to capture phenomena at different levels of analysis. Third, the research objectives encompass both understanding existing knowledge and generating new insights from empirical investigation, which is best achieved through combining synthetic and primary research methods.

The systematic literature review provides a comprehensive synthesis of existing research on assistive technology for SEN children, identifying effective interventions, documented barriers, and gaps in current knowledge. This component addresses the study's first objective (identifying and characterizing assistive technologies) and provides foundational knowledge for subsequent analysis. The qualitative case study component generates rich, contextualized data on assistive technology implementation in diverse under-resourced settings, addressing objectives two through four (analyzing barriers, examining impact, and developing contextually appropriate strategies). By integrating these methodological components, the study achieves both breadth (comprehensive understanding of the field) and depth (nuanced insights into specific contexts), enhancing the validity and applicability of findings [25].

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

A comprehensive search strategy was developed in consultation with a research librarian and following PRISMA guidelines for systematic reviews [56]. The search was conducted across multiple electronic databases selected for their coverage of education, technology, disability, and international development literature:

A. Primary Databases:

- Education databases: ERIC (Education Resources Information Center), Education Source
- Health and medical databases: PubMed/MEDLINE, CINAHL (Cumulative Index to Nursing and Allied Health Literature)
- Multidisciplinary databases: Web of Science, Scopus
- Technology databases: IEEE Xplore, ACM Digital Library
- International development databases: ELDIS, Development Experience Clearinghouse

B. Supplementary Searches:

- Google Scholar (first 200 results for each search string)
- Grey literature sources: UNESCO Digital Library, World Bank Open Knowledge Repository, WHO Global Cooperation on Assistive Technology (GATE)
- Citation tracking of key studies (forward citation searching using Google Scholar and Web of Science)
- Hand searching of key journals: Journal of Special Education Technology, Assistive Technology, British Journal of Educational Technology, Computers & Education.

C. Search Terms

The search strategy employed three concept groups combined with Boolean operators:

- Concept 1 - Population (SEN children): "special educational needs" OR "special needs" OR SEN OR "learning disability" OR "intellectual disability*" OR "developmental disability" OR "autism spectrum disorder" OR ASD OR "physical disability" OR "hearing impair*" OR "visual impair*" OR "communication disorder*" OR "inclusive education"*
- Concept 2 - Intervention (Assistive Technology): "assistive technology*" OR "assistive device*" OR "educational technology*" OR "information technology*" OR "digital tool*" OR "mobile learning" OR "m-learning" OR "augmentative communication" OR AAC OR "speech-to-text" OR "text-to-speech" OR "educational software" OR "learning app*" OR "adaptive technology*" OR "artificial intelligence" OR AI OR "virtual reality" OR VR OR "augmented reality" OR AR*
- Concept 3 - Context (Under-resourced settings): "low resource*" OR "under-resource*" OR "resource-constrained" OR "developing country*" OR "low-income" OR "middle-income" OR "limited resource*" OR "rural" OR "disadvantaged" OR "underserved" OR "low-and-middle-income countries" OR LMIC
- Search strings were adapted to each database's syntax and controlled vocabulary (e.g., MeSH terms in PubMed, ERIC descriptors). An example PubMed search string:

➢ *Inclusion Criteria:*

- Published between 2012 and 2025 (to capture recent technological developments while ensuring sufficient literature)
- Peer-reviewed journal articles, conference proceedings, systematic reviews, meta-analyses, or reports from reputable organizations (UNESCO, WHO, World Bank)
- Focus on children and youth (ages 3-21) with special educational needs
- Examine assistive technology, educational technology, or IT applications for SEN education
- Include empirical data, systematic review, or substantive analysis (not purely theoretical or opinion pieces)
- Published in English (due to resource constraints for translation)

Relevant to or conducted in under-resourced contexts (low- or middle-income countries, rural areas, disadvantaged communities) or provide insights applicable to such contexts.

➢ *Exclusion Criteria:*

- Studies focusing exclusively on adults (over age 21)
- Studies examining only medical or therapeutic interventions without an educational component
- Studies of mainstream educational technology without specific attention to SEN or accessibility
- Purely technical papers describing technology development without implementation or evaluation
- Studies conducted exclusively in high-resource settings without transferable insights
- Editorials, commentaries, or opinion pieces without empirical data
- Duplicate publications (most recent or comprehensive version retained).

Findings were organized thematically as presented in the Literature Review chapter, with attention to: (1) landscape of assistive technologies, (2) effectiveness and impact, (3) barriers to implementation, (4) AI and emerging technologies, (5) teacher preparedness, (6) disability-specific applications, (7) cultural and contextual considerations, (8) policy frameworks, and (9) research gaps.

D. Case Study Methodology

Case study methodology was selected for the empirical component of this research because it enables in-depth, contextualized investigation of complex phenomena in real-world settings [74]. Assistive technology implementation involves multiple interacting factors, technological, pedagogical, organizational, cultural, and economic, that are best understood holistically within specific contexts rather than through isolated variable analysis. Cases were selected using purposive sampling with a maximum variation strategy to capture diverse contexts, technologies, and implementation approaches. Selection criteria included:

➢ *Primary Criteria:*

- Geographic diversity: Cases from different world regions (Europe, Asia, North America) to capture varied cultural, economic, and policy contexts

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

- Resource variation: Range from moderately under-resourced (UK, USA) to severely resource-constrained (rural India) settings
- Technology diversity: Different types of assistive technologies (AAC apps, educational software, VR/AR, text-to-speech tools) to examine varied interventions
- Disability focus: Cases addressing different disability categories (autism, learning disabilities, communication disorders, physical disabilities)
- Implementation maturity: Mix of established programs and recent implementations to examine sustainability and scaling

➢ *Secondary Criteria:*
- Accessibility for data collection (willingness to participate, language accessibility)
- Availability of multiple data sources (documents, observations, interviews)
- Sufficient implementation duration (at least 6 months) to observe outcomes
- Presence of both successes and challenges to enable balanced analysis.

➢ *Case 1: Forest School, United Kingdom*

Context: Forest School is a specialized educational institution in the United Kingdom serving children with diverse special educational needs, including autism spectrum disorder, learning disabilities, and communication disorders. While located in a high-income country, the school serves a community with mixed socioeconomic backgrounds and faces resource constraints typical of specialized SEN schools, including limited budgets for Technology and ongoing professional development. The UK context provides insights into assistive Technology implementation within a strong policy framework for inclusive education, but with practical resource limitations.

- Technology Implementation: Forest School has integrated multiple assistive technologies, including:
✓ Speech-to-text software (e.g., Dragon NaturallySpeaking) to support students with writing difficulties
✓ Text-to-speech applications for students with reading disabilities
✓ Interactive educational games and apps (e.g., elements from the education.com platform) to enhance engagement
✓ Visual scheduling and organizational apps for students with autism
✓ Communication boards and apps for non-verbal students
✓ The school's approach emphasizes personalized learning plans that incorporate technology as one component within comprehensive instructional strategies. Technologies are selected based on individual student assessments and integrated into daily classroom routines.

➢ *Implementation Characteristics:*
- Implementation duration: 3+ years for core technologies, with ongoing additions
- Teacher training: Initial workshops plus ongoing peer mentoring and external support
- Technical support: Part-time IT coordinator plus external vendor support
- Family involvement: Some home-school Technology continuity, though limited by device availability

➢ *Case 2: Samarthanam Trust for the Disabled, Bangalore, India*

Samarthanam Trust for the Disabled is a non-governmental organization based in Bangalore, India, providing educational and rehabilitation services for children with disabilities in both urban and rural areas. The organization serves primarily low-income families in contexts characterized by significant resource constraints, including limited infrastructure, intermittent electricity and internet connectivity, low digital literacy, and cultural stigma surrounding disability. This case provides critical insights into assistive.

Technology implementation under severe resource constraints.
- Technology Implementation: Samarthanam Trust has implemented affordable, locally adapted assistive technologies, including:
✓ Mobile learning applications (Duolingo ABC, ABCmouse.com) adapted to local languages (Kannada, Hindi)
✓ Avaz AAC application for non-verbal children, with customized vocabulary reflecting local context
✓ Low-cost tablets loaded with educational content for offline use
✓ Audio learning materials for children with visual impairments

- Simple communication boards and picture exchange systems as low-tech alternatives

The implementation strategy emphasizes community engagement, local language adaptation, offline functionality, and building local capacity for Technology support and training.

➢ *Implementation Characteristics:*
- Implementation duration: 2+ years with iterative adaptation
- Training approach: Community-based training for parents, teachers, and children; peer training models
- Technical support: Local staff trained in basic troubleshooting; simplified technologies requiring minimal support
- Sustainability strategy: Focus on affordable, durable technologies; building local maintenance capacity; partnerships with Technology providers for reduced-cost access

➢ *Case 3: Future Minds Academy, South Korea*

Context: Future Minds Academy is a specialized center in South Korea providing therapeutic and educational services for children with autism spectrum disorder and other developmental disabilities. South Korea has high Technology infrastructure and digital literacy, but specialized services for SEN children remain concentrated in urban areas with significant costs. This case illustrates the implementation of cutting-edge technologies in a middle-income Asian context with strong technological capacity but emerging inclusive education frameworks.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

Technology Implementation: Future Minds Academy employs advanced immersive technologies, including:

- Virtual reality (VR) environments for social skills training, phobia reduction, and experiential learning
- Augmented reality (AR) applications for interactive learning experiences
- YouTube VR and custom VR content for controlled sensory experiences
- Robotics and AI-powered interactive learning companions
- Biofeedback and emotion recognition applications

The academy's approach leverages South Korea's technological infrastructure to provide intensive, Technology-enhanced therapeutic interventions in controlled clinical-educational settings.

➢ *Implementation Characteristics:*

- Implementation duration: 18+ months for VR/AR program
- Training: Specialized training for therapists and educators in VR/AR pedagogy; ongoing professional development
- Technical support: Dedicated technical staff for equipment maintenance and content development
- Cost and scalability challenges: High equipment and training costs; requires specialized expertise; limited scalability to less-resourced settings

➢ *Case 4: A Middle School, Texas, USA*

Context: A middle school in Texas serves a diverse student population, including students with various special educational needs in an inclusive education model. While located in the United States, the school serves a community with mixed socioeconomic backgrounds and faces typical challenges of under-resourced public schools, including limited budgets, large class sizes, and competing priorities. This case provides insights into assistive Technology integration within mainstream inclusive education in a moderately resourced setting.

Technology Implementation: The school has integrated assistive technologies, including:

- Text-to-speech software (WordTalk, Natural Reader) for students with reading disabilities
- Educational platforms (ABCmouse.com for younger students, Khan Academy for older students)
- Google Workspace with accessibility features for collaborative learning
- Speech-to-text tools for students with writing difficulties
- Organizational and executive function apps for students with ADHD and learning disabilities
- Technologies are integrated within the school's response-to-intervention (RTI) framework, with tiered supports matched to student needs.

➢ *Implementation Characteristics:*

Implementation duration: 4+ years with evolving Technology portfolio

- Training: District-provided professional development; school-based Technology coaches; online resources
- Technical support: District Technology department plus school-based support
- Integration approach: Technology embedded within a multi-tiered support system; coordination between special education and general education teachers.

VI. DATA COLLECTION METHODS

Multiple data collection methods were employed in each case to enable triangulation and a comprehensive understanding. Documents were analyzed to understand implementation processes, decision-making, resource allocation, and outcomes documentation.

Surveys (Case 4 only). In the Texas middle school case, brief surveys were administered to special education teachers (n=12) and students (n=28) to supplement interview and observation data. Surveys included:

- Likert-scale items assessing Technology usefulness, ease of use, frequency of use, and satisfaction
- Open-ended questions about benefits, challenges, and suggestions

The demographic and background survey data provided a broader quantitative context while maintaining the primary qualitative focus of the case study research. In terms of data collection procedures and timeline, our research showed that some were carried out over a 12-month period using a phased, staggered approach designed to capture comprehensive insights across all selected cases.

VII. ANALYSIS

This mixed-methods investigation demonstrates that assistive technologies, such as augmentative and alternative communication (AAC) tools, text-to-speech and speech-to-text software, mobile learning platforms, and immersive environments like virtual and augmented reality, offer significant potential to expand educational access and improve outcomes for learners with SEN.

A. Qualitative Data Analysis

Qualitative data from interviews, observations, and documents were analyzed using thematic analysis following Braun and Clarke's (2006) six-phase approach, facilitated by NVivo 14 qualitative data analysis software.

B. Qualitative Data Analysis

Thematic Cross-Case Analysis: Themes identified within individual cases were compared across cases to identify:

- Common themes appearing across all or most cases
- Variations in how themes are shown in different contexts
- Case-specific themes not appearing elsewhere
- Relationships between contextual factors and theme patterns

VIII. DISCUSSION

The purpose of this study is to investigate how assistive technologies can meaningfully enhance educational outcomes for children with Special Educational Needs (SEN) in under-resourced communities. Specifically, it seeks to identify the types of technologies currently in use, analyze barriers to

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

adoption, examine their effects on learning and social inclusion, and propose strategies for equitable and sustainable implementation. Grounded in the Social Model of Disability and the Technology Acceptance Model, the study combines a systematic literature review with qualitative case studies to generate actionable insights for policymakers, educators, and researchers.

Despite this promise, multiple barriers continue to limit adoption in under-resourced settings. Foundational infrastructure challenges, unreliable electricity, poor internet connectivity, and insufficient technical support are among the most significant factors identified.

The integration of the Social Model of Disability and the Technology Acceptance Model provides a dual analytical perspective. The Social Model highlights the importance of removing systemic barriers, while the Technology Acceptance Model emphasizes user perceptions of usefulness and ease of use. Combined, these frameworks suggest that successful implementation depends both on structural reform and the cultivation of user confidence and acceptance.

B. Future Research Directions

Given that our study was limited in scope, future investigations should address several key areas:

- Longitudinal Impact: Assess the long-term educational and social outcomes of assistive technology interventions.
- Cost-Effectiveness Models: Develop and test sustainable financing mechanisms for affordable, scalable implementation in low-resource contexts.
- Cultural Responsiveness: Design and evaluate technologies that reflect local linguistic, cultural, and pedagogical contexts.
- Intersectional Barriers: Examine how infrastructural, economic, pedagogical, and policy constraints collectively shape implementation.
- Stakeholder Perspectives: Gather insights from students, families, and communities to inform design and implementation strategies.
- Scaling Frameworks: Explore models for transitioning successful pilot projects into broader, system-wide programs.
- Emerging Technologies: Evaluate the ethical, pedagogical, and practical implications of advanced and immersive technologies in SEN education.

IX. CONCLUSION

Assistive technologies hold considerable promise for advancing inclusive education within under-resourced environments. However, access to technology alone does not guarantee equitable educational outcomes. Sustainable progress depends on addressing both structural and contextual challenges, such as infrastructure development, affordability, teacher training, and cultural adaptation. Strengthened policy frameworks and targeted resource allocation are also essential for fostering inclusion and continuity. Ultimately, meaningful advancement requires a comprehensive, systems-based approach that integrates policy reform, capacity building, and user-centered design, ensuring that assistive technologies function as genuine enablers of inclusion rather than isolated interventions.

REFERENCES

[1]. E. D. Abdulhakovna and M. N. Toxirovna, "Methods for increasing the educational effectiveness of students with disabilities based on artificial intelligence," *Int. J. Pedagogics*, vol. 5, no. 6, pp. 397-401, 2025, doi: 10.37547/ijp/volume05issue06-105.

[2]. ABCmouse.com. (n.d.). *ABCmouse.com*. [Online]. Available: https://www.abcmouse.com/

[3]. [3] M. S. Alanazi, "Innovation for all: Unleashing the power of assistive Technology in special education in Arabic speaking countries," *J. Plus Educ.*, vol. 33, Special Issue, pp. 181-205, 2023, doi: 10.24250/jpe/si/2023/ma/.

[4]. A. Al-Azawei, F. Serenelli, and K. Lundqvist, "Universal Design for Learning (UDL): A content analysis of peer-reviewed journal papers from 2012 to 2015," *J. Scholarship Teaching Learn.*, vol. 16, no. 3, pp. 39-56, 2016.

[5]. Avaz Inc. (2024, Dec. 4). *Home - Avaz Inc*. [Online]. Available: https://www.avazapp.com/

[6]. R. Bhaskar, *A Realist Theory of Science*. Leeds, UK: Leeds Books, 1975.

[7]. M. Bhakiyasri, "AI enable personalized assistive tools to enhance education of disabled persons and its legal fallacies," *Int. J. Multidisciplinary Res.*, vol. 6, no. 6, 2024, doi: 10.36948/ijfmr. 2024.v06i06.31573.

[8]. V. Braun and V. Clarke, "Using thematic analysis in psychology," *Qualitative Res. Psychol.*, vol. 3, no. 2, pp. 77-101, 2006.

[9]. BrainPOP. (n.d.). *Online learning for kids | BrainPOP at home*. [Online]. Available: https://www.brainpop.com/at-home

[10]. A. J. A. Bueno and C. D. S. Lima, "Tecnologias assistivas e autismo: Inovações para a inclusão na educação básica," *Aracê: Direitos Humanos em Rev.*, vol. 7, no. 6, pp. 32942-32951, 2025, doi: 10.56238/arev7n6-224.

[11]. C. E. C. Caluña, V. Garcia, R. Aguiar, and C. B. Q. Paguay, "Estrategias inclusivas y uso de ia para mejorar el aprendizaje en estudiantes con trastornos del aprendizaje," 2025, doi: 10.64747/9epagq94.

[12]. R. J. Campado, C. M. D. Toquero, and D. M. P. Ulanday, "Integration of assistive Technology in teaching learners with special educational needs and disabilities in the Philippines," *Int. J. Professional Development, Learners Learn.*, vol. 5, no. 1, p. ep2308, 2023, doi: 10.30935/ijpdll/13062.

[13]. C. E. C. Campoverde, "El rol de la tecnología en la inclusión educativa de estudiantes con necesidades especiales," *Polo del Conocimiento*, vol. 10, no. 7, pp. 3360-3376, 2025, doi: 10.23857/pc.v10i7.10083.

[14]. D. Chahal, S. Chahal, and S. Chahal, "Assistive Technology in inclusive classrooms," 2024, doi: 10.70388/niilmub/241201.

[15]. J. W. Creswell and V. L. Plano Clark, *Designing and Conducting Mixed Methods Research*, 3rd ed. Thousand Oaks, CA: SAGE Publications, 2018.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

[16]. F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information Technology," *MIS Quarterly*, vol. 13, no. 3, pp. 319-340, 1989.
[17]. A. G. Dell, D. A. Newton, and J. G. Petroff, *Assistive Technology in the Classroom: Enhancing the School Experiences of Students with Disabilities*. Boston, MA: Pearson, 2007.
[18]. N. K. Denzin, *The Research Act: A Theoretical Introduction to Sociological Methods*. New York, NY: McGraw-Hill, 1978.
[19]. R. P. Devadas, "AI augmented education for children with special needs: A scholarly perspective," *World J. Adv. Eng. Technol. Sci.*, vol. 15, no. 3, pp. 2000-2008, 2025, doi: 10.30574/wjaets.2025.15.3.1125.
[20]. V. Donne and M. A. Hansen, "Artificial intelligence in special education," in *Advances in Computational Intelligence and Robotics Book Series*, pp. 231-254, 2025, doi: 10.4018/979-8-3373-2397-8.ch009.
[21]. Duolingo ABC. (n.d.). *Duolingo ABC*. [Online]. Available: https://abc.duolingo.com/
[22]. C. Dumitru, "Alternative and augmentative communication options in language skills development of students with specific learning disorders," 2024, doi: 10.20944/preprints202412.2392.v1.
[23]. V. Ebrahimian, "Empowering inclusive pedagogy: Teacher's experiences with AI-driven assistive technologies in special needs classrooms," 2025, doi: 10.21203/rs.3.rs-7408910/v1.
[24]. Education.com. (n.d.). *Educational games for kids' early learning | Education.com*. [Online]. Available: https://www.education.com/games/
[25]. M. D. Fetters, L. A. Curry, and J. W. Creswell, "Achieving integration in mixed methods designs—Principles and practices," *Health Services Res.*, vol. 48, no. 6pt2, pp. 2134-2156, 2013.
[26]. L. Finlay, "'Outing' the researcher: The provenance, process, and practice of reflexivity," *Qualitative Health Res.*, vol. 12, no. 4, pp. 531-545, 2002.
[27]. J. P. Gomes et al., "Tecnologias assistivas na educação inclusiva e sua aplicabilidade para a inclusão de alunos autistas nas escolas," *Lumen et Virtus*, vol. 15, no. 43, pp. 8196-8204, 2024, doi: 10.56238/levv15n43-042.
[28]. L. Graf et al., "Educação especial: Tecnologias integradas à sala de aula," *Rev. Acadêmica Online*, vol. 10, no. 53, p. e351, 2024, doi: 10.36238/2359-5787.2024.v10n53.351.
[29]. M. Gupta and S. Kaul, "AI in inclusive education: A systematic review of opportunities and challenges in the Indian context," *MIER J. Educ. Studies, Trends Practices*, 2024, doi: 10.52634/mier/2024/v14/i2/2702.
[30]. C. Howerter and T. Cardon, "AI in the special education toolbox," in *Advances in Computational Intelligence and Robotics Book Series*, pp. 157-186, 2025, doi: 10.4018/979-8-3373-1122-7.ch006.
[31]. M. A. Irawan and Z. Anwar, "Harnessing artificial intelligence for inclusive education management: Strategies for supporting students with special needs," *J. Educ. Management Instruction*, vol. 5, no. 2, pp. 350-370, 2025, doi: 10.22515/jemin.v5i2.11650.
[32]. M. Islam, "Technological advancements improving learning outcomes for special education students in Bangladesh," *Int. J. Business, Social Scientific Res.*, vol. 12, no. 2, pp. 11-15, 2024, doi: 10.55706/ijbssr12117.
[33]. A. Ismail, Y. Andriyati, M. Minarni, N. Febriani, and H. K. Rahel, "Efektivitas robot AI adaptif dalam mendukung pembelajaran inklusif bagi mahasiswa dengan learning disabilities di universitas darwan ali," *J. Comprehensive Sci.*, vol. 3, no. 12, pp. 5394-5401, 2024, doi: 10.59188/jcs.v3i12.2912.
[34]. J. Ismaili and E. H. O. Ibrahimi, "Mobile learning as alternative to assistive Technology devices for special needs students," *Educ. Inf. Technol.*, vol. 22, no. 3, pp. 883-899, 2017, doi: 10.1007/S10639-015-9462-9.
[35]. M. Kamran and N. Bano, "Employing assistive Technology (AT) for children with special educational needs: A case study from Pakistan," *Pakistan Development Rev.*, pp. 203-220, 2024, doi: 10.30541/v63i2pp.203-220.
[36]. M. Kamran and S. Siddiqui, "Assistive Technology integration," in *Advances in Educational Technologies and Instructional Design Book Series*, pp. 1-25, 2023, doi: 10.4018/978-1-6684-6868-5.ch001.
[37]. E. Karagianni and A. Drigas, "New technologies for inclusive learning for students with special educational needs," Apr. 2023. [Online]. Available: https://www.researchgate.net/publication/370300895
[38]. R. A. Khan and S. Sujatha, "AI in special education: Enhancing learning outcomes for students with disabilities," *Int. J. Accounting Economics Studies*, vol. 12, no. SI-1, pp. 97-105, 2025, doi: 10.14419/ana2t992.
[39]. A. C. Kirongo, D. Bundi, D. Kitaria, G. S. Huka, and G. M. Muketha, "Implementation of AI-based assistive technologies for learners with physical disabilities in Kenya: A practical design thinking approach," *African J. Sci., Technol. Social Sci.*, vol. 1, no. 1, 2022, doi: 10.58506/ajstss.v1i1.71.
[40]. U. Koranteng, "AI and assistive Technology in special education: Transforming learning access for students with disabilities," *Asian J. Educ. Social Studies*, vol. 51, no. 9, pp. 240-252, 2025, doi: 10.9734/ajess/2025/v51i92361.
[41]. V. Krishnamoorthy, N. B. Trivedi, R. Sarkar, R. Saini, and A. Arjunasamy, "Empowering inclusive higher education," 2025, doi: 10.4018/979-8-3373-5077-6.ch002.
[42]. J. Ligia, A. R. P. Magaly, S. S. R. Patricio, and S. S. P. Elizabeth, "Assistive technological tools to strengthen interaction, communication and learning in children with different abilities," 2020, doi: 10.1007/978-3-030-40690-5_34.
[43]. Y. S. Lincoln and E. G. Guba, *Naturalistic Inquiry*. Newbury Park, CA: SAGE Publications, 1985.
[44]. Login Giants. (2023, Mar. 1). *How to enable & use VR mode in YouTube 2023 | Watch YouTube VR | YouTube App* [Video]. YouTube. [Online]. Available: https://www.youtube.com/watch?v=jzFp0ObbtYA
[45]. D. Maor, J. Currie, and R. Drewry, "The effectiveness of assistive technologies for children with special needs: A review of research-based studies," *European J. Special Needs Educ.*, vol. 26, no. 3, pp. 283-298, 2011, doi: 10.1080/08856257.2011.593821.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25nov1567

[46]. G. D. S. C. Mattos, E. C. D. Oliveira, M. C. S. D. M. Penha, D. F. M. D. Anjos, and S. F. Brito, "Tecnologia a serviço da inclusão: Ferramentas digitais para uma educação mais acessível," 2025a, doi: 10.56238/1stcongresssevenmultidisciplinarystudies-055.

[47]. G. D. S. C. Mattos, M. C. S. D. M. Penha, N. N. P. F. Alves, K. C. S. D. Souza, and E. V. M. D. S. Espíndola, "Inovação tecnológica como apoio ao ensino inclusivo," 2025b, doi: 10.56238/1stcongresssevenmultidisciplinarystudies-043.

[48]. T. E. Michuy-Guingla, C. A. Fajardo-Andrade, M. F. Fajardo-Andrade, D. S. Limongi-Basantes, and F. A. Quiroz-Parraga, "La tecnología educativa en el proceso de aprendizaje de estudiantes con necesidades educativas especificas," 2025, doi: 10.55813/gaea/rcym/v3/n3/59.

[49]. M. B. Miles, A. M. Huberman, and J. Saldaña, *Qualitative Data Analysis: A Methods Sourcebook*, 4th ed. Thousand Oaks, CA: SAGE Publications, 2020.

[50]. G. M. D. Moraes, "A inclusão de tecnologias assistivas no currículo: Facilitando a aprendizagem de alunos com necessidades educacionais especiais," *Rev. Brasileira de Filosofia e História*, vol. 14, no. 3, 2025, doi: 10.18378/rbfh.v14i3.11552.

[51]. D. L. Morgan, "Pragmatism as a paradigm for social research," *Qualitative Inquiry*, vol. 20, no. 8, pp. 1045-1053, 2014.

[52]. A. N. Nabijonovna, "Prospects for the use of artificial intelligence technologies in the inclusive education process," *European Int. J. Pedagogics*, vol. 5, no. 4, pp. 68-70, 2025, doi: 10.55640/eijp-05-04-16.

[53]. NeuroLaunch.com. (2024, Aug. 11). *Autism hands: Decoding hand movements in autism spectrum disorder*. [Online]. Available: https://neurolaunch.com/autism-hands/

[54]. O. A. Olakanmi, G. Akçayır, O. M. Ishola, and C. D. Epp, "Using Technology in special education: Current practices and trends," *Educ. Technol. Res. Development*, vol. 68, no. 4, pp. 1711-1738, 2020, doi: 10.1007/S11423-020-09795-0.

[55]. M. Oliver, *The Politics of Disablement*. London, UK: Macmillan Education UK, 1990.

[56]. M. J. Page et al., "The PRISMA 2020 statement: An updated guideline for reporting systematic reviews," *BMJ*, vol. 372, p. n71, 2021, doi: 10.1136/bmj.n71.

[57]. M. Q. Patton, *Qualitative Research & Evaluation Methods*, 4th ed. Thousand Oaks, CA: SAGE Publications, 2015.

[58]. I. D. Perdison, F. K. Anku, and B. Bright, "Effect of assistive Technology and training on academic performance among college students with physical disabilities at Presbyterian College of Education, Akropong-Akuapem, Ghana," *European J. Physical Educ. Sport Sci.*, vol. 10, no. 6, 2024, doi: 10.46827/ejse.v10i6.5563.

[59]. B. Perelmutter, K. K. McGregor, and K. R. Gordon, "Assistive Technology interventions for adolescents and adults with learning disabilities," *Computers Educ.*, vol. 114, pp. 139-163, 2017, doi: 10.1016/J.COMPEDU.2017.06.005.

[60]. J. Popay et al., *Guidance on the Conduct of Narrative Synthesis in Systematic Reviews*. Lancaster, UK: Lancaster University, 2006.

[61]. M. S. Ramaiah, S. K. S. Nagarajan, P. Whig, and P. K. Dutta, "AI-powered innovations transforming adaptive education for disability support," in *Advances in Educational Technologies and Instructional Design Book Series*, pp. 73-100, 2024, doi: 10.4018/979-8-3693-8227-1.ch004.

[62]. T. Rasheed, "Understand the impact of adaptive AI learning system on students with learning disabilities," 2025, doi: 10.63056/acad.004.03.0414.

[63]. P. R. Ray and B. Zaveri, "The role of Technology in implementing effective education for children with learning difficulties," *Scientific Temper*, vol. 15, no. 04, pp. 3432-3440, 2024, doi: 10.58414/scientifictemper.2024.15.4.53.

[64]. R. Sarkar and R. Madhu, "Ensuring equity and access for students with disabilities," in *Advances in Computational Intelligence and Robotics Book Series*, pp. 93-138, 2025, doi: 10.4018/979-8-3373-5097-4.ch004.

[65]. V. Shevchenko, "Use of modern digital technical aids in the conditions of inclusive educational environment," *European Humanities Studies*, vol. 4, pp. 169-180, 2024, doi: 10.38014/ehs-ss.2024.4.10.

[66]. S. Shivani, M. Gupta, and S. B. Gupta, "Системний аналіз освітніх інструментів на основі штучного інтелекту для людей з інвалідністю: Досвід індії," *Information Technologies and Learning Tools*, vol. 100, no. 2, pp. 199-216, 2024, doi: 10.33407/itlt.v100i2.5501.

[67]. D. G. S. Sisalima, "Uso de tecnologías de apoyo para la inclusión educativa de estudiantes con discapacidad auditiva: Mejorando el aprendizaje y la participación en el aula," *Dominio de las Ciencias*, vol. 11, no. 2, pp. 1172-1189, 2025, doi: 10.23857/dc.v11i2.4378.

[68]. SLPCarrie. (2023, Mar. 10). *Start here! - Speech and language kids*. Speech and Language Kids. [Online]. Available: https://www.speechandlanguagekids.com/start-here/

[69]. R. E. Stake, *Multiple Case Study Analysis*. New York, NY: Guilford Press, 2006.

[70]. C. C. Thompson and S. Okonkwo, "Management of artificial intelligence as an assistive tool for enhanced educational outcomes," 2025, doi: 10.4018/979-8-3373-3678-7.ch009.

[71]. E. R. Torres, R. C. Rodríguez, and E. T. Briñez, "Use of AI to improve the teaching-learning process in children with special abilities," 2023, doi: 10.62486/latia202321.

[72]. UNESCO, *Global Education Monitoring Report 2020: Inclusion and Education*. Paris, France: UNESCO Publishing, 2020.

[73]. WordTalk. (n.d.). *WordTalk*. [Online]. Available: https://www.bing.com/search?q=WordTalk

[74]. R. K. Yin, *Case Study Research and Applications: Design and Methods*, 6th ed. Thousand Oaks, CA: SAGE Publications, 2018.