

Perspectives of Pakistani Special Education Teachers on the Integration of Artificial Intelligence in Resource-Constrained Environments: A Qualitative Study

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Abstract

Artificial intelligence (AI) has revolutionized teaching, especially in special education, where students need personalized support and flexible methods. AI-based educational technologies are becoming more popular day by day. But many educational systems are not using such technologies, especially in low-resource contexts. This study was conducted to examine the perspective of Pakistani special-education teachers on integration of AI into a special-education classroom in resource-constrained environment. 21 purposively-selected public-school special-education teachers participated in qualitative semi-structured interviews. Braun and Clarke's (2006) thematic analysis was used to analyze the interview data. The findings of the study revealed the perspective of special-education teachers on the integration of AI into resource-constrained special-education classroom through four themes (1) readiness for AI adoption, (2) opportunities for improving special education, (3) challenges in implementation, and (4) recommendations for successful integration. The study suggests teacher training, improved technological infrastructure, and supportive policies to enable effective AI integration in special education. These findings contribute to discussions about using AI in education fairly and inclusively, especially in low-resource settings.

Keywords: Artificial Intelligence in Education, Special Education, Inclusive Education, Teacher Perceptions, Resource-Constrained Environments.

Introduction

Artificial intelligence (AI) is rapidly changing many industries, including education. AI-driven adaptive instruction, intelligent tutoring, automated feedback, and personalized learning environments are changing education (Katiyar et al., 2024). These technologies support individualized learning and diverse student needs, improving educational outcomes. AI can improve accessibility, engagement, and learning in special education, where students need individualized instruction and support. AI-powered tools can help teachers customize lessons, track student progress, and support disabled students. Speech recognition, assistive communication, and adaptive learning platforms help students with visual, hearing, motor, or learning disabilities participate more in school (Habib et al., 2022). AI can help special-education teachers (SETs) manage diverse learning needs with personalized instruction and data-driven insights. AI-integration in education is uneven. Most research and technological developments have occurred in well-resourced educational systems, while resource-constrained schools face major adoption barriers. Technology integration is hindered by poor infrastructure, internet access, professional training, and institutional or policy support. Teachers are crucial to educational technology implementation. Attitudes, readiness, and perceptions strongly influence classroom digital tool adoption and use (Boonmoh et al., 2021). Teachers' perspectives are crucial in special education, where instruction must be tailored to individual learners, when applying technologies like AI. Understanding their perspectives can

illuminate AI-integration's pros and cons. Educational settings with limited resources face greater challenges. Such SETs often have few technological resources, training opportunities, and institutional support. They must also help students with diverse learning needs use AI-based learning tools. Teachers may recognize AI's benefits but face practical constraints that limit its use. Thus, it is crucial to study how under-resourced teachers view AI in their classrooms. Explore their perspectives to determine their readiness, the benefits of special education, and the barriers to implementation. Our insights can help create policies, training programs, and technologies that support teachers and students in resource-constrained environments. Thus, this study examines Pakistani SETs' views on AI-integration in resource-constrained schools. The study adds to AI in education research by examining teachers' readiness, perceived opportunities, and challenges to AI adoption. It also highlights the realities faced by teachers in under-resourced contexts. The findings should inform policymakers, educational leaders, and technology developers promoting equitable and effective AI-integration in special education.

Statement of the Problem

AI is now seen as a powerful educational tool. Personalization, adaptive instruction, and accessibility for all students are possible with it. AI-powered smart educational apps, adaptive learning platforms, and assistive communication systems can help special student. These technologies help teachers customize lessons and engage students, especially those who need extra help. Despite these benefits, AI is not widely used in schools, especially in low-resource areas (Zhang & Leong, 2024). Many developing countries' schools struggle due to a lack of money, technology, internet access, and teacher training. These restrictions can make AI technologies harder to use, especially in special education, where they could help disabled students. The benefits of AI in education have mostly been studied in technologically advanced and well-funded settings. Thus, we know little about how teachers in low-resource systems feel about using AI in their classrooms. Teachers' attitudes, readiness, and experiences affect how well new technologies work in the classroom. AI in special education is harder in Pakistani public schools due to resource constraints. However, little research has examined special SETs' AI-integration preparedness, perceived benefits, and challenges. This study examines Pakistani SETs and related professionals' views on AI in low-resource schools.

Rationale of the Study

The global interest in AI has accelerated the development of educational technologies to improve teaching and learning. AI tools can personalize learning, engage students, and assist students with special needs (Barua et al., 2022). SETs and students need personalized instruction, and AI may help. AI works best when it's available and teachers are willing to use it. Teachers need school support to use AI tools in the classroom. Teachers in low-resource areas often lack infrastructure, training, and digital technology. These issues can hinder AI use and performance. AI research in education is growing, but little is known about how developing country SETs use it. Teachers are key users of educational technologies, so understanding their perspectives is crucial. Their insights can reveal real issues, highlight opportunities, and inform local strategies. This study examines Pakistani resource-limited SETs' views on AI-integration. The research examines readiness, opportunities, and challenges to inform educational policy, teacher training, and AI-based tools for under-resourced settings.

Significance of the Study

This study fills a gap in AI-related research in education, particularly in resource-constrained special education. Most AI studies focus on well-resourced educational systems, but few examine how under-resourced teachers perceive AI-integration. This study examines Pakistani SETs and professionals to contextualize AI adoption in education. The results should help many. Teachers learn the pros and cons of using AI in special education from the study. By

understanding these factors, teachers can prepare for new technologies and improve their teaching of disabled students. The research provides policymakers and educational administrators with evidence to improve equitable access to educational technologies. The findings can inform teacher training, infrastructure, and responsible AI-integration funding. The study may also help tech developers understand resource-poor teachers' needs and issues. Such insights can help resource-constrained schools create practical and accessible AI-driven educational tools. This research contributes to the discussion about fair and open technology use in education. By focusing on teachers' experiences in low-resource schools, AI innovations can help all students, including those with disabilities.

Objectives of the Study

Objectives of study are as following:

1. To explore how SETs in resource-constrained environments perceive their readiness to integrate AI into their teaching practices.
2. To identify the perceived opportunities that AI presents for enhancing teaching and learning in special-education settings.
3. To examine the challenges and barriers that hinder the effective adoption of AI tools in under-resourced special-education institutions.
4. To analyze how different roles within special education (e.g., head teachers, psychologists, computer and physical education instructors) view the integration of AI.
5. To provide insights and recommendations for policymakers and educational stakeholders to support the responsible and equitable implementation of AI in special education.

Research Questions

This study finds the answers of following questions:

1. How do SETs in resource-constrained environments perceive their readiness to integrate AI into their classrooms?
2. What opportunities do SETs identify for the use of AI in enhancing teaching and learning for students with disabilities?
3. What challenges and barriers do SETs face in adopting AI technologies in resource-constrained settings?
4. How do the perspectives on AI-integration differ among various roles within special education, such as head teachers, psychologists, physical education teachers, and vocational instructors?
5. What recommendations do special SETs have for improving AI adoption and implementation in their classrooms, particularly in low-resource environments?

Literature Review

In recent years, AI in education has gained popularity. Researchers say it can transform education with personalized instruction, adaptive learning systems, and increased accessibility (Gligorea et al., 2023). AI can help special student, but it raises ethical and practical issues (Rakap, 2024). This section discusses AI in education research, its role in special education, teachers' readiness, and resource shortages.

AI in Education

Innovations like AI are crucial to modern education. AI-based tools are increasingly used for personalized teaching, intelligent tutoring, adaptive learning environments, and automated feedback (Rizvi, 2023). These tools help teachers make data-driven decisions and personalize learning. AI systems can analyze large amounts of educational data to find patterns in student learning and test performance (Shawon et al., 2023). This allows teachers to tailor their lessons to each student's needs, improving learning and engagement. As schools seek better teaching

methods, AI is becoming more popular (Shah, 2023). Not all education sectors use AI at the same rate. AI-based technologies are difficult to implement and use in many schools, especially those with limited resources (Tariq, 2024). However, well-funded schools are using these technologies more.

AI in Special Education

AI has great potential in special education, where personalized instruction and adaptive learning are crucial. Disabled students need individualized learning, communication tools, and progress monitoring (Rojo et al., 2022). AI-powered adaptive learning systems, assistive technologies, and intelligent support tools can help meet these needs and promote inclusive education (Ayeni et al., 2024). Apps like speech recognition, text-to-speech, predictive communication, and intelligent tutoring can help disabled students learn (Ahmed et al., 2025). These technologies help teachers personalize learning materials, provide immediate feedback, and assist struggling students in traditional classrooms. AI systems can also help teachers identify student issues, track progress, and plan interventions (Sajja et al., 2025). Studies show that AI can help special needs students learn and stay interested by adapting content to their level and speed (Farhah et al., 2025). How ready, knowledgeable, and open-minded teachers are about these technologies affects their effectiveness.

Teachers' Readiness for AI-integration

Teachers are crucial to educational technology adoption. Attitudes, perceptions, and tech skills affect how well they use new classroom tools. Digital literacy, professional development, institutional support, and technological experience affect teachers' technology integration readiness, according to research (Mpuangnan, 2024). Many use the Technology Acceptance Model (TAM) to justify technology use (Granić & Marangunić, 2019). This model states that useful and easy-to-use technologies are more likely to be used (Natasia et al., 2022). In education, teachers' views on how AI can improve teaching and learning can affect whether they use these tools. Many teachers say they're not ready for AI (Mehdaoui, 2024). Due to a lack of training, knowledge, or confidence, teachers are often unprepared to use AI tools in the classroom (Iddrisu & Iddrisu, 2025). Due to their complex duties, SETs may find these issues even harder to handle.

Challenges of AI-integration in Resource-Constrained Environments

AI can be helpful in schools, but using it in low-resource areas is difficult (Khan et al., 2024). Low-income schools struggle to get reliable internet, modern computers, and specialized software for AI applications (Hussein et al., 2025). Schools in developing countries may also lack money, technical support, and teacher training programs (Bulathwela et al., 2024). Because of this, teachers may recognize AI's value but struggle to use it. AI in schools raises moral concerns (Saylam et al., 2023). Data privacy, algorithmic bias, and student data security must be addressed carefully (Chelghoum & Chelghoum, 2025). Special student may be vulnerable and need more privacy protection, making these concerns crucial.

Opportunities of AI for Inclusive and Personalized Learning

Despite its drawbacks, AI can aid personalized and inclusive learning, say researchers (Zhang & Zhang, 2024). AI-powered systems can adapt lessons to students' skills, interests, and progress (Jamaludin et al., 2025). These flexible learning environments meet all students' needs (Bi, 2025). AI can keep special student engaged with interactive lessons and materials tailored to them (Moharana, 2025). AI tools can help struggling students stay motivated and engaged by creating learning activities tailored to their levels (Rasheed et al., 2025). AI can help teachers plan lessons, evaluate student performance, and complete paperwork (Zhang & Zhang, 2024). Teachers, policymakers, and technology developers must collaborate for AI to work.

Successful implementation requires new ideas, helpful policies, teacher training, and enough technology.

Research Gap

While AI is becoming more important in education, most research focuses on technologically advanced educational systems. SETs in resource-limited settings have received insufficient attention. There is little empirical research on how SETs in developing countries view AI's opportunities, challenges, and preparedness. Understanding how teachers feel about technology is important because they influence its use. This study examines Pakistani SETs and professionals' views on AI-integration in resource-constrained schools.

Theoretical Framework

AI in education depends on teachers' perceptions, technological readiness, and institutional environment. This study is influenced by Technology Acceptance Model (TAM) and Constructivist Learning Theory. TAM of Davis (1989) shows how people choose new technologies based on their usefulness and ease of use (Natasia et al., 2022). Perceived usefulness is the likelihood that technology will improve your job, and perceived ease of use is its perceived simplicity. We learn why teachers use digital tools and AI systems in the classroom from TAM. When teachers believe AI will improve teaching and learning, they are more likely to use it. However, lack of training, infrastructure, and concerns about its complexity can make people think it's harder to use and slow adoption. TAM is a good way to assess teachers' AI readiness and attitudes. This study follows Constructivist Learning Theory, which states that people learn by interacting with their surroundings (Bada & Olusegun, 2015). Researchers like Piaget and Vygotsky stressed that students learn through tools, experiences, and conversations. AI technologies can personalize lessons, provide interactive feedback, and improve constructivist learning. Special student needs different instruction, so these tools are useful. In low-resource areas, teachers' use of these technologies is crucial to their success. Constructivists believe AI should enhance meaningful learning experiences rather than replace teachers. Using TAM and Constructivist Learning Theory, this study provides a comprehensive understanding of teachers' AI-integration perceptions. TAM explains how teachers evaluate and adopt AI technologies, while constructivism emphasizes AI's role in student-centered and adaptive learning.

Figure 1: Theoretical Framework for AI-integration in Special Education

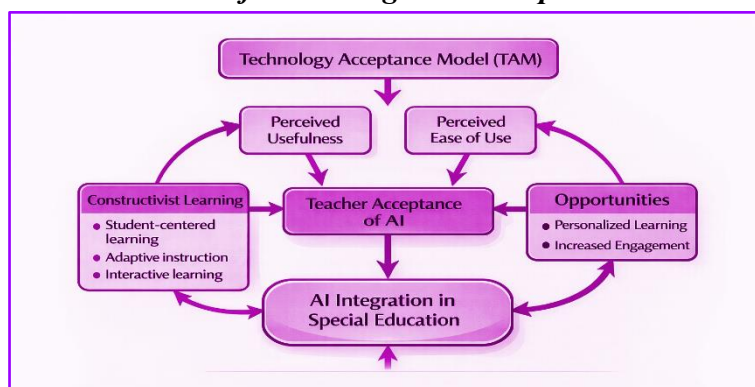


Figure 1 shows the study's theoretical framework. The Technology Acceptance Model explains AI adoption through perceived usefulness and ease of use, while Constructivist Learning Theory emphasizes AI's role in adaptive, student-centered special education.

Figure 2: Conceptual Framework of AI-integration in Special Education in Resource-Constrained Environments

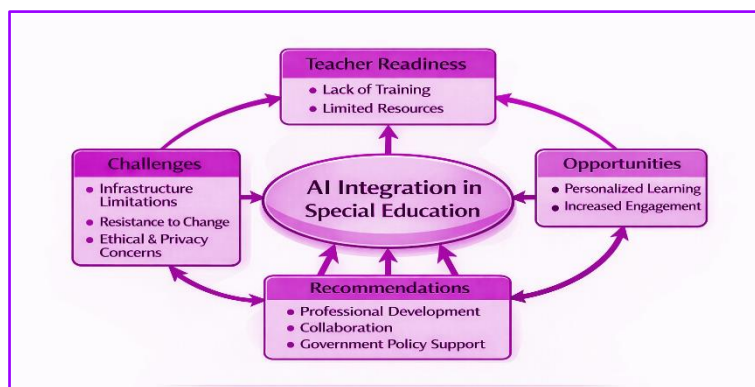


Figure 2 shows the conceptual framework of study that how teacher readiness, opportunities, and challenges affect AI-integration in special education, with policy support and training enabling success.

Methodology

This qualitative study examined SETs' views on using AI in low-resource schools. The methodology documented participants' experiences, interpretations, and perspectives on AI's opportunities and challenges in special education. This section discusses the study's philosophy, research design, participant selection, data collection, and analysis.

Research Paradigm and Philosophical Foundations

To understand how AI is used in special education, we must examine how teachers process their experiences. Research paradigms underpin knowledge creation and comprehension. This section discusses the study's paradigm, assumptions, ontological, and epistemological perspectives.

Research Paradigm

The study used a constructivist paradigm, arguing that individual and collective experiences shape knowledge. This perspective allowed the study to examine how resource-limited SETs view AI in their classrooms. It recognizes that teachers' backgrounds, teaching environments, and perceptions shape their understanding of AI in special education.

Philosophical Assumptions

The study relies on constructivist assumptions. First, reality is subjective and shaped by experience. Teachers have many AI perspectives. Meaning is created, according to Crotty (1998). Second, social interaction creates knowledge. Teachers' views on AI are shaped by their interactions with colleagues, students, and the educational framework, demonstrating Vygotsky's (1978) idea that learning and meaning evolve through social processes. Third, context matters. These teachers' AI readiness and views depend on their schools' limited resources. Infrastructure and support issues affect AI-integration in special education and understanding.

Epistemology

research uses an interpretivist epistemology, seeing knowledge as collaboratively constructed through dialogue. The study seeks to understand how teachers interpret AI experiences rather than finding an objective reality. The study examines how and why teachers perceive AI adoption opportunities, preparedness, and challenges in resource-constrained special education to understand its complex dynamics.

Methodological Approach

A qualitative approach was used to follow the constructivist paradigm and emphasize individual experiences. Semi-structured interviews allowed participants to express their views and the researcher to explore new ideas. This method is good for complex, situation-specific issues like AI in special education.

Research Design

The study used a qualitative exploratory research design to examine SETs' views on AI in resource-limited settings. This design allowed participants' experiences, attitudes, and perspectives on emerging educational technologies to be examined. We used semi-structured interviews to gather detailed information, then used thematic analysis to find recurring themes.

Role of the Researcher

In qualitative research, researchers actively interpret participants' experiences. This study relied on the researcher to interview, organize, and identify themes. Reflexivity was used throughout the research. The researcher conducted interviews with transparency to allow participants to freely express their views on AI-integration, aware that personal experiences and assumptions may affect interpretation. The researcher guided the interviews using the interview protocol and made sure participants felt safe sharing their experiences. To ensure comprehension, interview transcripts were read several times during analysis. Constant reflection reduced bias and ensured that results reflected participant views.

Research Context

The study was conducted in resource-constrained Pakistani public sector special-education institutions. These schools serve students with vision, hearing, motor, physical, and learning disabilities. Many public special-education schools lack funds, technology, and infrastructure. Teachers use old methods because they don't have many digital tools, the internet is poor, and they aren't trained in new technologies. Despite these issues, teachers must adapt their methods to meet the needs of disabled students. AI can help these students in new ways, but its efficacy in low-resource areas is unclear. Schools often lack resources, training, and technical support for teachers. To identify opportunities and barriers, we must understand how teachers feel about AI adoption. This study documents the experiences of SETs in these contexts to better understand AI-integration in Pakistan.

Population and Sampling

The depth and usefulness of qualitative research data depend on selecting the right participants. This study focused on resource-limited SETs.

Population

The population included public sector SETs who worked with students with visual impairment (VIC), hearing impairment (HIC), intellectual challenges (MC), physical disabilities (PHC), and slow learners. Special teachers, head teachers, psychologists, computer, physical, vocational, and music teachers were present. These participants worked in schools with limited infrastructure, teaching tools, and professional development. This made them good candidates for studying AI-integration in low-resource areas.

Sampling

Purposive sampling was used to identify participants with AI-integration experience in special education. This method let the researcher choose people with in-depth and useful subject knowledge. Purposive sampling ensured participants understood AI's pros and cons. It also allowed the study to include professionals from different fields, which helped it understand how AI could be used in special education.

Inclusion and Exclusion Criteria

Participants were required to work in public schools for disabled students as SETs, head teachers, psychologists, computer teachers, or vocational instructors. Must have worked with or known about AI in education. Because the study focused on underfunded public schools, private school teachers were not included. People without special education or AI experience were excluded to ensure real-world answers.

Sample Size

The study included 21 participants. Qualitative research sample size is determined by data richness, not statistical representation. Data collection continued until thematic saturation was reached, meaning no new themes emerged afterward.

Participants

The study included 21 purposively-sampled public school SETs. The sample included 10 SETs (2 from each field i.e. HIC, VIC, PHC, MC and slow learners), 2 head teachers, 2 psychologists, 2 computer teachers, 2 physical instructors, 1 music teacher, and 2 vocational teachers. Participants had different ages, teaching experience, and education levels, so they had different opinions on the pros and cons of using AI in special-education classrooms with limited resources.

Table 1: Profile of Study Participants

S. No	Code Name	Age	Gender	Experience (Years)	Education	Field
1	HT-01	42	Male	15	MA Special Education	Head Teacher
2	HT-02	40	Female	14	MA Special Education	Head Teacher
3	VI-01	35	Female	8	M.Ed. (Special Education)	Teacher (VIC)
4	VI-02	30	Male	6	M.Ed. (Special Education)	Teacher (VIC)
5	HI-01	38	Female	10	M.Ed. (Special Education)	Teacher (HIC)
6	HI-02	40	Female	12	M.Ed. (Special Edu) M.Phil	Teacher (HIC)
7	MC-01	33	Female	9	M.Ed. (Special Education)	Teacher (MC)
8	MC-02	29	Female	7	M.Ed. (Special Education)	Teacher (MC)
9	PH-01	32	Female	8	M.Ed. (Special Education)	Teacher (PHC)
10	PH-02	28	Female	5	M.Ed. (Special Education)	Teacher (PHC)
11	SL-01	36	Female	10	M.Ed. (Special Edu), M.Phil	Teacher (Slow Learners)
12	SL-02	34	Female	8	M.Ed. (Special Education)	Teacher (Slow Learners)
13	PS-01	38	Female	10	MSc Psychology	Psychologist
14	PS-02	33	Female	8	MSc Psychology, M.Phil.	Psychologist
15	CT-01	40	Female	12	MCS	Computer Teacher
16	CT-02	35	Female	8	MCS + M.Phil.	Computer Teacher
17	PT-01	31	Male	6	M.P.Ed.	PT Teacher
18	PT-02	29	Female	5	M.P.Ed.	PT Teacher
19	MT-01	28	Male	5	Graduation in Music Science	Music Teacher
20	VT-01	34	Female	7	Diploma in Vocational Education	Vocational Teacher
21	VT-02	32	Female	6	Diploma in Vocational Education	Vocational Teacher

Instrumentation

The study collected data through semi-structured interviews. This method allowed researchers to thoroughly analyze participants' perspectives and experiences while focusing on significant AI challenges in special education.

Interview Guide

A semi-structured interview guide ensured consistency and allowed participants to debate fresh ideas. The guide includes open-ended questions on the study's main themes—preparedness, opportunities, difficulties, and AI-integration solutions. This style encouraged participants to freely discuss their thoughts and experiences. The four guide portions matched research questions. The first portion assessed participants' AI preparedness based on their knowledge, skills, and resources. They were asked about their resources, training, and AI attitudes. The second segment examined AI's potential in special education, asking how it may improve accessibility, instruction, and student support. The final portion addressed infrastructure, training, and technology barriers. Participants discussed AI tool problems. Participants suggested ideas for legislators and educational leaders to integrate AI and increase school adoption in the last portion.

Piloting the Instrument

Before data collection, a small sample of people who met the study participants' requirements pilot evaluated the interview guide. This ensured a smooth interview and helped grade question relevancy and clarity. Based on comments, minor instrument improvements were implemented.

Validity and Reliability

Several steps were taken to increase interview validity and reliability. Participants reviewed interview transcripts to verify their answers and interpretations. Using the same semi-structured interview guide for all participants ensured reliability by asking the same basic questions. Deviations were noted and explained. A seasoned researcher reviewed the transcripts to ensure data interpretation consistency.

Data Collection Procedure

The researcher employed semi-structured interviews to examine participants' thoughts on AI in special education. Interviews focused on teachers' readiness to employ AI tools, their opportunities, and their challenges. Each interview lasted 30–45 minutes, depending on how in-depth the answers were. With consent, interviews were audio recorded to ensure data accuracy. Transcribed recordings allowed for deeper investigation.

Data Analysis Procedure

The data was analyzed using Braun and Clarke's (2006) six-phase thematic analysis. Qualitative researchers use this method to uncover and evaluate textual patterns. The researcher first reviewed the interview transcripts numerous times to learn the data. The earliest codes were created by labeling significant data chunks. Third, we grouped codes to find themes. Fourth, these themes were revised to match the coded data and study questions. Fifth, each subject was defined and named to convey its fundamental idea. Finally, the themes were translated and structured into a narrative to describe participants' views on AI readiness, opportunities, problems, and special education proposals.

Ethical Considerations

To protect study participants, ethical guidelines were followed. After being informed of the study's objectives, procedures, and ability to withdraw, all participants gave informed permission. Research findings were anonymized to preserve privacy. Participation was

voluntary and unforced. Additionally, participants were told that they might exit the research at any moment without penalty.

Trustworthiness of the Study

To ensure qualitative results reliability, several methods were used. Member checking allowed participants to verify their answers, boosting trustworthiness. Explaining the research background, participants, and procedures helped readers assess the findings' relevance in diverse contexts. A transparent audit trail of theme development, code, and research ensured dependability. Reflexive practices (i.e. acknowledging biases and being transparent throughout data analysis) boosted confirmability.

Data Analysis

This study used Braun and Clarke (2006) theme analysis to analyze data. It is a common qualitative method for finding and presenting data patterns. It lets researchers methodically evaluate participant replies and identify key themes. Thematic analysis was used to examine SETs' views on AI inclusion in resource-limited educational settings, revealing parallels and contrasts.

Data Preparation

The interview recordings were initially typed word-for-word. Each transcript was read numerous times to ensure accuracy and understand what participants said. Transcripts were anonymized, and participants were given code names like HT-01 and VI-02 to maintain privacy. This method removed personal data while preserving context.

Familiarization and Initial Coding

After preparing the data, the researcher carefully read and reread the transcripts to understand them. This stage revealed participants' feelings and opinions about AI in special education. The initial stage of coding identified and coded key data points. These codes represented crucial research question information. The code focused on participants' AI readiness, potential, and challenges. First codes were lack of training materials, hands-on workshops, AI assistance with individualized learning, and AI infrastructure lack. These algorithms sorted and interpreted the data later in the study.

Theme Development

After making the first codes, the researcher looked for patterns and linkages to uncover themes. We grouped codes for related thoughts to create themes that reflected most participants' feelings. The study examined instructors' preparation for AI-integration opportunities, implementation problems, and adoption strategies. These themes revolved around that. The key themes and subthemes from the analysis are in Table 2.

Table 2: Themes and Subthemes Identified Through Thematic Analysis

Theme	Subtheme	Description	Example Quote
Theme 1: Readiness and Preparedness to Integrate AI	Lack of Adequate Training	Participants reported feeling unprepared due to limited training opportunities related to AI applications in education.	“We need more training that focuses on real classroom use, not just theory.” (CT-01)
	Limited Access to Resources	Teachers highlighted the absence of essential technological tools such as computers, internet access, and AI software.	“Without the right resources, even the best AI tools are useless in our classrooms.” (HT-02)
Theme 2: Opportunities of AI in Special Education	Personalized Learning	Participants believed AI could help tailor instruction to individual student needs, particularly for students with disabilities.	“AI can help us address individual student needs, especially those with more severe disabilities.” (VI-01)
	Enhanced Engagement and Motivation	Teachers perceived AI tools as capable of increasing student engagement through interactive learning methods.	“Interactive AI tools could increase engagement for students who struggle with traditional methods.” (MC-02)
Theme 3: Challenges and Barriers to AI-integration	Lack of Infrastructure	Inadequate technological infrastructure was identified as a major obstacle to AI implementation.	“Even if AI could work in theory, it requires infrastructure that we just don't have.” (PT-02)
	Resistance to Change	Some teachers expressed reluctance toward adopting new technologies, preferring traditional teaching approaches.	“There's a reluctance to adopt AI. Some teachers prefer traditional methods and are unsure about technology.” (VI-02)
	Ethical and Privacy Concerns	Participants raised concerns regarding data privacy and the ethical use of AI in educational settings.	“We need strict guidelines to protect our students' privacy, especially when dealing with AI systems.” (PS-01)
Theme 4: Recommendations for Successful AI-integration	Training and Support	Participants emphasized the importance of continuous professional development and structured training programs.	“A long-term, structured training program could make a huge difference in our preparedness to use AI effectively.” (PT-01)
	Collaborative Approach	Teachers suggested collaboration among teachers, administrators, and technology experts for successful implementation.	“AI-integration should be a collaborative effort involving not only teachers but also administrators and tech experts.” (HT-01)

Figure 3: Thematic Map of AI-integration in Special Education in Resource-Constrained Environments

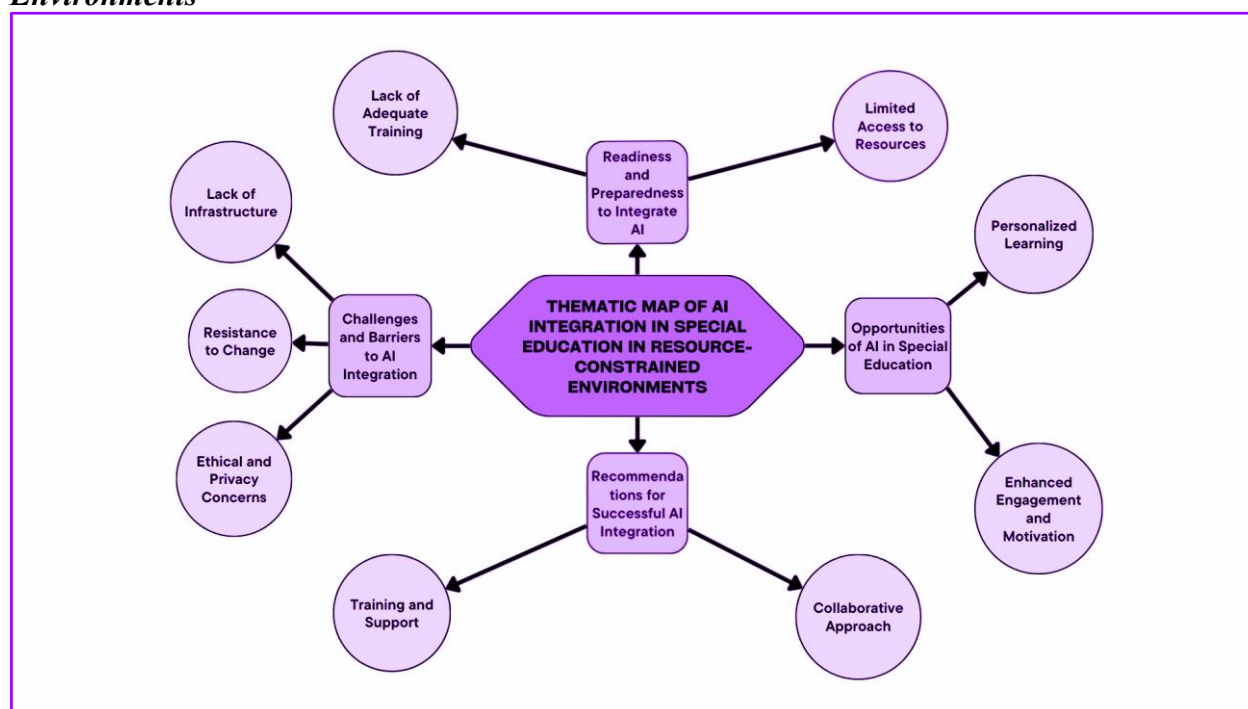


Figure 3 depicts the key themes and subthemes from SET’s interviews. The four themes reflect teachers’ perspectives on AI-integration in resource-constrained environments, i.e. (1) readiness for AI adoption, (2) opportunities for improving special education, (3) challenges in implementation, and (4) recommendations for successful integration.

Reviewing and Defining Themes

After locating the themes, they were thoroughly reviewed to ensure they appropriately represented the coded data and met study aims. The researcher checked the consistency of coded snippets within each theme and ensured that the themes were distinct. Each theme was then named to indicate its major meaning and relationship to the study. This process ensured that the themes were essential patterns in how participants thought about applying AI in special education in low-resource settings.

Interpretation of Data

Finally, the themes were examined in light of the research topic. The investigation showed that SETs recognized AI's potential to improve disability education. Participants highlighted AI's ability to personalize lessons and engage students. They did acknowledge it was difficult to implement in low-resource areas. Lack of professional training, insufficient technology infrastructure, opposition to change, and data privacy and ethical concerns were among them. The results demonstrate that special-education institutions must train, support, and set clear norms for teachers to handle practical and moral difficulties for AI to perform properly.

Findings

Semi-structured interviews revealed various perspectives on using AI in special education in resource-constrained settings. Thematic analysis identified four main themes: teacher preparedness for AI-integration, AI's potential benefits in special education, barriers to AI-integration, and implementation strategies. These topics demonstrate how individuals feel, think, and worry about AI in classrooms.

Teacher Readiness for AI-integration (Theme 1)

Regarding whether or not they were prepared to apply AI in their instruction, participants' perspectives varied. AI had the potential to improve special education, but many teachers didn't know how to apply it. AI's potential to aid students with special needs delighted some. However, anxieties about lack of knowledge, skills, or resources sometimes tempered this hope. Teachers indicated their readiness depends on their technological knowledge, digital tool experience, and school assistance. Many believed AI could improve individualized learning and student engagement, but they weren't sure how to use it. This showed the gap between what AI could do and what teachers could do in real classrooms. They were unprepared due to insufficient training and technology.

Lack of Adequate Training

The absence of professional training in AI and special education worried many participants. AI technologies were unfamiliar to many teachers, who hadn't been trained to use them in their classes. This left them confused about AI, how it could aid students with disabilities, and how it could be applied in ordinary education. Participants indicated most professional development programs rarely discussed AI. This left many teachers unprepared for new digital tools. A participant stated, "*There's a gap between what AI can offer and what I know how to do with it in a classroom setting*" (VI-01). Teaching staff preferred structured training programs that focused on practical application rather than theory. They indicated hands-on training, demonstrations, and continued professional development might boost their confidence and AI tool skills. Many assumed AI-integration would be difficult without this help.

Limited Access to Resources

Participants often identified insufficient training and technology resources as barriers to AI-integration. School infrastructure like computers, internet, software, and digital learning platforms was lacking in many schools. Teachers wanted to explore AI tools, but the infrastructure was lacking. Because digital gadgets and internet connectivity were scarce, most classrooms used traditional teaching methods. This was especially true in public schools with

teachers, especially those who prefer older methods, may find this adjustment difficult or unnecessary. According to participants, some teachers don't think AI is effective in the classroom. AI tools could be difficult to use or make teachers' duties worse, which scared people. New technology can make teaching even more demanding. This hesitancy is also induced by insufficient digital technology exposure. Teachers unfamiliar with advanced tools may doubt their AI skills. Participant: "A lot of my coworkers are still skeptical about AI. They say it's too hard and unnecessary since we're already busy." (VI-01)

Ethical and Privacy Concerns

Participants worried about ethical and data privacy considerations while employing AI in education. Many teachers stressed the importance of protecting students' personal data, especially when AI systems collect and analyze it. Teachers warned that AI systems may access private data about students' learning, behavior, and disability. Without proper security, this data could be exploited or accessed by unauthorized parties. Special student may be at risk, making these concerns more pressing. Participants emphasized the need for explicit ethical and data protection norms when schools use AI. They also suggested teaching instructors on AI ethics. A school psychologist stated, "We need to make sure that any AI tools we use are safe and that student data is handled with the greatest care to avoid possible misuse" (PS-02). The findings suggest that AI-integration in special education requires more than new technology. We need stronger infrastructure, teacher training, and ethical norms to deploy AI ethically in low-resource schools.

Figure 6: Word Cloud Representing Challenges in AI-integration in Special Education



Figure 6 (word cloud) highlights the main challenges of AI-integration in special education. Key terms reflect major barriers and concerns.

Recommendations for Successful AI-integration (Theme 4)

Participants offered many solutions to the challenges of using AI in special education. They acknowledged infrastructural, training, and institutional support issues, but they highlighted that teachers, administrators, policymakers, and technology developers could solve them together. Helping teachers grow professionally, bringing stakeholders together, and strengthening government support and policies were the main ideas. Participants said improving these areas will help teachers employ AI-based tools in the classroom. Their proposals illustrate that AI requires new technology, ready institutions, enough training, and supportive legislation.

Professional Development and Training

One major idea was that teachers should receive continual AI-focused professional development. To effectively use AI in instruction, teachers need theoretical and practical understanding, participants said. Many teachers wanted to employ AI tools but weren't trained. Participants indicated training programs should emphasize hands-on learning over theory.

illuminate instructors' views on emerging technologies and their deployment in under-resourced settings.

Figure 8: Process Model for AI Adoption in Special Education

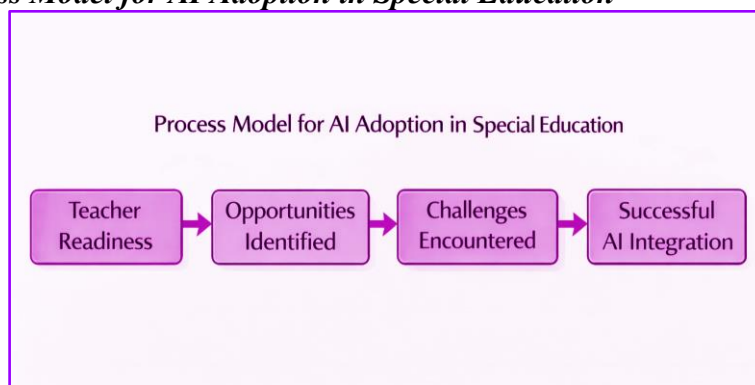


Figure 8 shows how teachers evaluate AI adoption, moving from readiness and opportunities to challenges and the need for institutional and policy support for successful integration.

It was vital to realize that teachers weren't ready to use AI in classes. Many participants wanted to adopt AI tools, but they claimed training and technology were issues. This suggests that teachers recognize AI's benefits but lack the skills, expertise, and institutional support to deploy it. This supports previous findings showing teacher preparedness is crucial to educational technology adoption. Teachers' digital skills and professional development are key to technology integration, according to research. Without training, teachers may not know how to use new teaching tools. According to the Technology Acceptance Model (TAM), instructors' readiness to employ a technology depends on its usefulness and ease of use. Teachers who are unfamiliar with AI tools may find them difficult to utilize, reducing their use. These findings emphasize the need for targeted professional development to increase teachers' confidence and technical skills. Despite these issues, the survey participants recognized several positives of adopting AI in special education, including its capacity to tailor learning and engage students. Teachers assumed AI could change how and what disabled students learned to match their requirements. AI systems can alter learning materials based on student intelligence, learning speed, and communication needs. These abilities can assist teachers build more inclusive and adaptive learning environments in special education, when tailored instruction is needed. Participants also thought AI tools may make things easier for students with learning, motor, and visual impairments. Constructivist learning theory emphasizes participatory, learner-centered education, which supports these findings. AI can improve these environments by providing tailored learning routes, adaptive feedback, and engaging activities. Teachers can use AI to make learning more engaging for students with various needs.

Participants also thought AI tools might stimulate students. Interactive platforms and adaptive learning apps can engage students more than traditional teaching techniques, especially those who struggle in the classroom. The study also revealed some issues that make AI application in low-resource areas difficult. Technology shortages were the most common complaint. Participants typically reported limited computer access, intermittent internet connectivity, and insufficient digital resources as barriers to AI-based education. Early studies have shown that solid infrastructure is needed to use digital technologies in education. In many underdeveloped nations, schools struggle to provide basic technology, making AI use difficult. Another issue was teachers' resistance to technology advances. Teachers who prefer the old way may not use modern technology. Insufficient technological experience, confidence, or concerns that new technologies will increase their workload may cause this aversion. Participants discussed ethical and privacy issues with AI in education. Privacy, data protection, and ethical technology use are concerns since AI systems collect and analyze student data. Special student may be

vulnerable and need particular protection of their personal data. Participants suggested some solutions to these issues. Developing comprehensive teacher training programs was crucial. Teachers said training should include real-world examples of AI tools in the classroom. This supports research showing that technological integration requires ongoing learning. Training programs that enable teachers to try out AI tools can boost their confidence and skills. Participants stressed the importance of teacher-administrator-technologist collaboration. Together, schools can find practical ways to employ AI, share information, and get technical aid. The findings suggest that the government should invest more in educational technologies and strengthen policies. Participants underlined that everyone needs better infrastructure, enough money, and clear legislative frameworks for responsible technology use to have equal access to AI capabilities. These results generally impact schools and policies. They emphasize greater teacher training, better technology in underfunded schools, and AI guidelines for schools. Research should continue to examine teachers' experiences in resource-limited situations to develop context-specific AI-integration techniques for inclusive educational systems.

Conclusion

This study explored SETs' views on AI in low-resource schools. The study included qualitative interviews with teachers and other stakeholders to examine teachers' readiness to use AI, its potential for special education, and its implementation challenges. Teachers know AI can improve how students with disabilities learn and get them more involved, but in schools with limited resources, there remain challenges to its usage. Not having enough technology, not getting professional training, and not wanting to change technology are major issues. Despite these issues, others believed AI could improve special education. AI technology was supposed to improve individualized training, lesson flexibility, and student motivation. These findings suggest that AI could improve educational outcomes for students with diverse learning needs with the right infrastructure and instruction. The study also shows how important it is for teachers to be ready for AI-integration to work. Without educational training and support, teachers may struggle with AI technologies. Schools and policymakers should prioritize helping teachers master new digital skills. This study examines Pakistani SETs' experiences, adding to the increasing body of AI in education research and providing context-specific insights for policy formulation, teacher training, and the development of easy-to-use AI-based instructional technologies. Teachers, politicians, technology developers, and schools must collaborate for AI to work in special education. To ensure that students with disabilities can benefit from AI, infrastructure, teacher training, and policies must be improved, especially in low-resource schools.

Recommendations

The Findings of this study suggest:

1. Teachers should have access to AI-focused professional development. Theories and practices should be taught in workshops and hands-on sessions. Teachers can learn to use AI tools in their classrooms with ongoing training.
2. Technology infrastructure must be improved. Schools need computers, stable internet, and the correct software for AI-based learning. Schools need funding and resources from governments and educational bodies to employ digital technologies.
3. Teachers, administrators, technology specialists, and policymakers must collaborate for AI inclusion. Working with universities and tech companies can help create school-friendly AI solutions.
4. Policymakers should also establish clear principles for ethical AI use in education. The guidelines should encompass data privacy, responsible technology use, and fair access.
5. To narrow the digital divide and ensure equal access to AI technologies, we should give underfunded schools money or technological subsidies.

6. Research should examine how AI tools might be used in special education, especially in underdeveloped nations. Additional research might examine instructors' long-term AI contacts and find ways to overcome technological and institutional barriers.

Limitations of the Study

This study has several limitations. First, its qualitative design with a small sample of 21 participants provided comprehensive insights but restricted generalizability. Second, the participants were exclusively picked from public sector special-education institutions in resource-limited contexts, suggesting that private or wealthier teachers may have different perspectives. Third, conversations with people about their experiences may have revealed biases or viewpoints. Fourth, the study assessed teachers' opinions of AI rather than implementing or assessing AI tools in education. Despite these limitations, the study provides context-specific insights regarding AI-integration in special education and suggests future research and policy.

Declarations

1. Author declares the sole authorship of the article. The research design, data collection, analysis, interpretation, and manuscript preparation were solely done by the author
2. The author declares no conflict of interest.

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