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Educational Technology-Enabled Differentiated Instruction for Inclusive Education: Examining Opportunities, Implementation Challenges, and Policy Pathways in Pakistan

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Abstract

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The teaching methods in inclusive education must be flexible and fulfil the needs of diverse learners. The study explored opportunities, implementation challenges, and policy pathways of educational technology-based differentiated instruction to support inclusive education in Pakistan. The research design used was a qualitative exploratory design using an interpretive approach. Semi-structured interviews were used to collect data involving 20 key participants from the education sector, comprising teachers, special education teachers, teacher educators, experts in educational technology, and education administrators. Based on thematic analysis, educational technology was found to facilitate personalized learning, accessibility, student engagement, and flexible instructional practices. However, factors of digital inequality, lack of infrastructure, teachers' lack of competencies, and institutional constraints did impact the effective implementation. The study found that the sustainable development of technology-supported inclusive education in Pakistan needs all four components, namely, coordination of policy frameworks, development of digital infrastructure, professional development of teachers, and integration of differentiated pedagogical practices.

Keywords: Educational Technology; Differentiated Instruction; Inclusive Education; Digital Learning; Assistive Technology; Teacher Competencies; Pakistan

Introduction

Inclusive education is a key focus of education reform efforts around the world, with the principle that all children, irrespective of disability, socio-economic status, gender, or learning differences, deserve equal access to and success in education (Filippou et al., 2025; Manzoor et al., 2022). The UNESCO Global Education Monitoring Report has raised awareness of the need to tackle exclusion in education systems by creating learning environments that respond to the needs of learners rather than requiring learners to fit into uniform systems (UNESCO, 2020). Recent research also highlights the need for flexible learning spaces, accessible resources, and supportive teaching practices to meet the needs of all learners, including students with disabilities and those facing barriers to learning (Kamran & Bano, 2023; Filippou et al., 2025).

Traditional teacher-centered learning methods, however, tend to use standard textbooks, standard learning methods, and standardized tests, which may not meet the needs of students with varying capabilities, interests, and learning styles. Because of this, differentiated instruction (DI) has come about as an approach to teaching that is based on the needs of the learner, giving the teacher flexibility in content, teaching process, learning activity, and assessment. A differentiated approach was found to be beneficial for improving the motivation of diverse students and their academic performance (Asif-Un-Nisa & Ambreen, 2020). Furthermore, research in Pakistan has identified that differentiated instruction can offer opportunities for accommodating learner diversity and inclusive classroom practices, as teachers can use flexible teaching methods (Manzoor et al., 2022).

The role of educational technology in supporting differentiated instruction includes the flexibility for providing individual learning opportunities through adaptive platforms, digital materials, multimedia content, and assistive technology. Studies have shown that digital technologies can be used to promote inclusive

education, enhance the accessibility of learning, offer adaptive educational activities, and help teachers create learning programs based on individual needs (Lynch et al., 2022; Syaidah et al., 2025). But the use of technology must be designed to include all learners and teacher readiness, along with appropriate educational support systems.

Educational Technology and Inclusive Education in Pakistan

The education sector in Pakistan has witnessed a gradual shift towards digitalization over the years, especially with the introduction of online learning platforms and the use of technology in education in response to the COVID-19 pandemic. Digital platforms, learning management systems, online educational resources, and assistive technologies offer ways to enhance access to, participation in, and engagement with learning for students who are faced with barriers in traditional educational settings. The use of technology can provide opportunities for teachers to offer flexible learning pathways and personalized support, especially for students with disabilities and diverse learning needs. Valiandes and Neophytou (2017) noted that digital classrooms have the potential to offer possibilities for differentiated instruction, in which teachers can offer various levels of access to learning content.

There is recent evidence that learning technologies can contribute to inclusive education and improve accessibility, participation of learners, and adaptive teaching. Research has indicated that digital tools can offer opportunities for students with disabilities via assistive technology, accessible learning materials, and flexible learning environments (Lynch et al., 2022; Mintz et al., 2024). Likewise, systematic reviews have shown that technology can be an opportunity or a challenge for inclusive education, depending on access to the appropriate infrastructure, the competences and skills of the teachers, and institutional support (López et al., 2025; Murillo-Jiménez et al., 2025). However, the integration of technology in Pakistan is still hindered due to various issues,

such as unequal access to technology, limited infrastructure, lack of teacher training, and limited institutional support (Amjad et al., 2025; Akhter et al., 2025).

Classrooms in Pakistan have a diverse population of students with varying academic skills, disabilities, socio-economic status, and learning needs, yet still use traditional models of teaching and learning. In the context of implementing differentiated instruction and promoting inclusive education, Educational Technology has great potential but faces the challenge of successful implementation caused by obstacles in technology, pedagogy, and policy. The current literature indicates that differentiated instruction is still in its infancy in the context of Pakistan, and there is not much empirical research that explores the use of technology-based differentiated approaches to support inclusive classroom practices (Saif et al., 2024). In addition, barriers associated with digital inequality, inadequate infrastructure, and limited teacher preparation, as well as institutional constraints, persist in the successful implementation of inclusive educational technologies (Murillo-Jiménez et al., 2025; López et al., 2025).

Thus, more research is needed to explore opportunities, barriers, and policy options for the integration of educational technology-supported differentiated instruction into the context of inclusive education in Pakistan. The knowledge of these dimensions is crucial to develop sustainable strategies for accessibility, equity, and meaningful participation of diverse learners in the Pakistani educational context.

Research Objectives

- RO1: To examine the role of educational technology in supporting differentiated instruction practices for promoting inclusive education in Pakistan.
- RO2: To investigate the opportunities and challenges associated with integrating educational technology for accommodating diverse learners in Pakistani educational settings.
- RO3: To identify policy implications and strategic

recommendations for effective implementation of technology-supported differentiated instruction in inclusive education.

Research Questions

- RQ1: How does educational technology support differentiated instruction practices for promoting inclusive education in Pakistan?
- RQ2: What opportunities and challenges influence the integration of educational technology for addressing diverse learners' needs?
- RQ3: What policy strategies can strengthen the implementation of technology-supported differentiated instruction for inclusive education in Pakistan?

This study is important because it focuses on the role of educational technology-based differentiated instruction in promoting inclusive education in Pakistan, with the motivation to meet the educational, physical, and socio-economic needs of diverse learners. The study offers insights into the potential of digital technologies to enhance access, personalized learning, student engagement, and participation for a diverse set of learners (Lynch et al., 2022; Mintz et al., 2024). It also highlights the issues of digital inequality, infrastructure constraints, teacher preparedness, and institutional support that impact the effective integration of technology (Murillo-Jiménez et al., 2025; Amjad et al., 2025). The results can inform policymakers, educational leaders, and teachers in designing inclusive policies for digital education, professional development, and technology-enabled learning environments that are sustainable (López et al., 2025; Filippou et al., 2025).

Literature Review

Inclusive Education: Concept and Importance

Inclusive education is based on the principle that all learners have a right to quality education without discrimination based on disability, socioeconomic status, gender, language, ethnicity, and other characteristics (Murillo-Jiménez et al., 2025; López et al., 2025). It focuses on changing educational systems to

meet learner diversity and not expect learners to fit educational structures. According to [UNESCO \(2022\)](#), inclusion is about removing obstacles that block learners' access to, participation in, and benefits from learning. Inclusive education is not just about access to schools as a physical place, but also about the learning environment that is supportive and enables all students to experience belonging, respect, and meaningful participation. Recent research has highlighted the necessity of creating supportive learning environments, implementing effective practices, and fostering institutional dedication for meaningful inclusion of learners with diverse needs ([Rafiq-Uz-Zaman et al., 2025](#)).

Inclusive education has gained importance in the world because educational systems serve learners with a variety of abilities and backgrounds. Cognitive ability, learning speed, cultural background, language proficiency, and social background are different among students. Inclusive education needs flexible curricula, supportive teaching methods, and equitable opportunities for learning that ensure that all children can achieve their potential ([UNESCO, 2020](#)). Furthermore, research has pointed to the importance of taking into account the contextual aspects of inclusive education, especially within the context of disadvantaged and low-income schools, where social and technological factors can play a role in affecting how learners access and participate in inclusive education ([Castaño-Muñoz et al., 2025](#)). As a result, inclusive education is now an integral part of Sustainable Development Goal 4 on equitable and quality education for all learners.

Differentiated Instruction in Education

Differentiated instruction (DI) is a student-centred style of teaching that acknowledges learners' differences and tailors teaching methods to their readiness, interests, and learning profiles ([Manzoor et al., 2022](#)). Differentiated instruction is not about equating what students learn, how they learn, or how they demonstrate learning; instead, it is about changing what they learn, how they learn, and/or how they demonstrate learning ([Rafiq-Uz-Zaman](#)

[International "Journal of Academic Research for Humanities \(JARH\) 6\(3\)" et al., 2025](#)). This is especially relevant for classrooms that are inclusive of students who need a wide range of academic support.

Differentiated content is when the content of learning is modified based on students' abilities and prior knowledge ([Lynch et al., 2022](#); [Mintz et al., 2024](#)). Differentiated teaching methods include the use of several teaching approaches, including collaborative learning, inquiry, visuals, and individual guidance. Differentiated assessment allows teachers to assess learning using flexible approaches to suit the strengths of learners ([Asif-Un-Nisa & Ambreen, 2020](#)). Similarly, flexible learning spaces offer students opportunities for learning via diverse routes and at a pace that is suitable for their learning. Inclusive pedagogies research indicates that school engagement and participation can be improved through pedagogies that are responsive and take account of the diversity of learners as a positive asset in learning, rather than a problem to be solved ([UNESCO, 2022](#)). Recent studies also indicate that to improve the quality of differentiated learning opportunities for students with diverse educational needs and disabilities, inclusive teaching practices can be supported through the use of appropriate digital approaches ([Chattopadhyay, 2025](#)).

Educational Technology for Differentiated Instruction

The use of educational technology has opened up opportunities to incorporate differentiated instruction into learning experiences by offering flexibility, instructiveness, and personalization. Digital learning platforms, learning management systems (LMS), the use of multimedia resources, and AI-based learning tools and assistive technologies enable teachers to offer a variety of learning materials and support. Therefore, [UNESCO \(2023\)](#) underscores that access to education can be enhanced through technology, provided its use is informed by an approach to inclusive design and supported by the required infrastructure and teacher training.

Digital platforms enable students to access learning resources according to their individual

needs and learning pace (Lynch et al., 2022; Mintz et al., 2024). Content is supported through multimedia resources such as interactive applications, digital texts, simulations, and videos to accommodate varying styles of learning and enhance engagement (Chattopadhyay, 2025). AI-powered education tools can offer personalized learning experiences by monitoring student performance and suggesting appropriate tasks. In addition, assistive technologies like screen readers, speech-to-text applications, and accessible digital content help students with disabilities to overcome learning barriers. A few recent studies have shown the potential of digital technology to enhance inclusive education by offering opportunities for accessing learning; however, this potential is dependent on the correct implementation, teachers' readiness, and support in the context of education (Castaño-Muñoz et al., 2025).

Technology-based differentiated instruction is another way to encourage flexibility in learning by making learning available outside the classroom. Digital learning tools are gaining significance during and after the COVID-19 pandemic to ensure continuity and access to education (UNESCO, 2023).

Opportunities of Educational Technology for Inclusive Education

Educational technology offers a number of possibilities to reinforce inclusive education. In the first place, it can make learning more accessible, as it can provide opportunities for those who are unable to attend mainstream schools, for students with disabilities, and for disadvantaged groups (Manzoor et al., 2022). Second, technology can enable personalized learning and provide students with tailored instruction based on their ability and learning level (Asif-Un-Nisa & Ambreen, 2020). Digital platforms can enable several learning pathways and give instant feedback so that learning is more autonomous.

Technology also enhances the involvement of the students by creating interactive and engaging learning environments. Multimedia, online discussion, and collaborative digital tools

can promote active learning among learners whose learning stumbling points may be found in traditional classroom settings. Moreover, the use of educational technology helps teachers by offering them digital teaching resources, assessment tools, and data-based information that enable teachers to create more effective and differentiated lessons. UNESCO (2023) states, however, that technology will not lead to inclusion if there are problems of digital inequality and accessibility. Research on low-income settings also points to the need to consider the social environment of the learners, resources, and access to technology equitably in inclusive digital education (Castaño-Muñoz et al., 2025).

Challenges of Technology Integration in Pakistan

Educational technology has great potential to be used to facilitate inclusive and differentiated learning in Pakistan, but there are certain challenges that hinder its effective implementation. Access to reliable internet connectivity, digital devices, and electricity facilities is still a huge concern, as many students, especially rural and lower-income students, do not have them (Lynch et al., 2022; Mintz et al., 2024). World Bank (2020) found that the COVID-19 pandemic's rapid transition to digital learning highlighted inequalities in access to online learning amongst Pakistani learners.

One of the other challenges is inadequate technological infrastructure in educational institutions. Many schools don't have the digital tools, connections, and technical support structures needed for sustainable technology integration. Moreover, teachers' digital competence is a key factor, as modern and innovative digital tools must be combined with pedagogical knowledge, which is also digital, to implement effective differentiated instruction through technology (Griful-Freixenet et al., 2021). The same obstacles have been found in recent studies, such as lack of infrastructure, lack of teacher training, financial problems, and institutional issues that hinder the implementation of technology in inclusive educational environments (Rafiq-Uz-Zaman et

Policy Context of Educational Technology in Pakistan

The importance of digital transformation in education has become a growing reality in Pakistan, with efforts aimed at the promotion of online education, digital resources, and the use of technology in education (Manzoor et al., 2022). But inclusive technology integration calls for policies covering accessibility, infrastructure development, teacher training, and sustainable investment. Technology policies should not just introduce digital devices, but be aimed at creating educational technologies that are designed to respond to the needs of all learners.

Professional development is especially crucial for teachers, as they need to have practical abilities to apply digital tools and differentiated instruction. Likewise, for equity and to ensure technology is for all learners, there is a need for infrastructure development, affordable connectivity, and inclusive digital content (Castaño-Muñoz et al., 2025). Implementation of an inclusive education policy that will integrate education technology can assist Pakistan in building an equitable and responsive education system. The focus of recent literature is on the need for inclusive digital policies to incorporate institutional support and teacher training and development in order to promote sustainable educational inclusion (Chattopadhyay, 2025).

Theoretical Framework

The two theoretical frameworks used for guiding this study are Universal Design for Learning (UDL) and the Technological Pedagogical Content Knowledge (TPACK) framework. These frameworks can be combined to provide the tools to design flexible, student-centered learning environments that incorporate inclusive education, differentiated instruction, and educational technology (Mintz et al., 2024).

Universal Design for Learning (UDL)

Universal Design for Learning (UDL) is an inclusive design approach to learning that works by considering learner diversity from the start of

learning design. Instead of changing instruction when students have trouble, UDL helps teachers plan flexible learning opportunities for all students. There is emerging research that suggests that UDL is an important framework for supporting inclusion, accessibility, and equity (Cumming & Rose, 2022).

UDL is based on three core principles. Multiple means of representation means presenting information in various formats, like text, audio, video, graphics, and interactive formats, to enable students with diverse learning styles and abilities to learn. Multiple means of engagement is the second principle that aims to engage students' motivation through various means of participation, collaboration, and connection with learners' interests. Multiple means of expression lets students express themselves in a variety of ways such as writing, presentation, multimedia, or digital demonstration.

UDL is positioned closely to inclusive education as it acknowledges that learner diversity is a normal classroom phenomenon. It also allows for differentiated instruction and permits teachers to customize content, teaching strategies, and assessment techniques to student needs. The use of technology in education plays a role in helping to implement UDL by offering digital tools, accessible learning materials, and assistive technology to ensure flexible and personalized learning experiences (UNESCO, 2023).

TPACK Framework

Technological Pedagogical Content Knowledge (TPACK) is an explanation for the knowledge needed by teachers in order to effectively integrate technology into education. It emphasizes that the effective integration of technology is not a matter of just the technical aspects, but of three key knowledge areas: technology knowledge, pedagogical knowledge, and content knowledge.

Technology knowledge is defined as teachers' knowledge of digital tools, platforms, applications, and technological resources that can facilitate teaching and learning (Griful-

Freixenet et al., 2021). Pedagogical knowledge is the knowledge of instructional strategies, classroom management, assessment methods, and methods for supporting the diverse learner. Content knowledge is a teacher's knowledge of their subject matter.

The TPACK model proposes that technology integration happens when teachers integrate all three types of knowledge to make a selection of suitable tools for instruction that is congruent with the content and the learning objectives. TPACK is used in the discourses of inclusive education and differentiated instruction to suggest that teachers create technology-supported learning experiences that meet the needs of learners' differences instead of simply integrating technology into their current teaching (Lynch et al., 2022; Mintz et al., 2024). Thus, building the competencies of teachers is crucial in the context of an effective educational technology program in Pakistan's wide array of educational contexts (UNESCO, 2023).

Methodology

Research Design

The design of this study was qualitative exploratory research, which explored the opportunities and challenges for implementing differentiated instruction through educational technology for inclusive education in Pakistan and the policy path forward. A qualitative design was chosen for the study since it was designed to explore the experiences, perceptions, and practices of educational stakeholders in the integration of technology and learner-centered approaches. Creswell and Creswell (2017) highlighted that qualitative research designs are suitable for investigating complex educational phenomena where researchers seek to understand participants' perspectives and contextual experiences.

Research Approach

The study was interpretive research because of the study's aim of understanding the participants' perceptions and experiences of the integration of educational technology, differentiated instruction, and inclusive educational practices. The interpretive approach

helped the researcher to investigate meanings attributed by participants to the use of technology in teaching within the Pakistani context. The process employed was consistent with qualitative educational research, where the social reality is revealed from participants' perspectives (Creswell & Creswell, 2017).

Population

The study population comprised educational stakeholders who had direct experience in educational technology, inclusive education, and teaching-learning practices in Pakistan. These stakeholders encompassed teachers, special education teachers, teacher educators, education technology experts, and education administrators/policymakers. They had a wide range of professional experiences, which enabled them to have a broad perspective on the use of technology in differentiated instruction.

Sample and Sampling Technique

A purposive sampling technique was used to select 20 participants for the study. Purposive sampling was applied due to the selection of participants being based on their relevant knowledge, work experience, and participation in inclusive education or in practices related to educational technology. Purposive sampling is suitable for a qualitative study when the sample is selected for their certain characteristics or skills associated with the phenomenon being studied (Campbell et al., 2020).

The participant distribution was as follows:

Participants	Number
Teachers	8
Special education teachers	4
Teacher educators	3
Educational technology experts	3
Education administrators/policymakers	2

Data Collection Tool

Semi-structured interviews were used to collect data. The interview protocol was designed to seek participants' experiences and views on the following: Educational technology practices, differentiated instruction strategies, opportunities and constraints of the integration of technology, and recommendations for enhancing education policies in Pakistan. Semi-structured interviews gave participants room to

elaborate on their answers, while also covering key research areas.

Data Analysis

Thematic analysis was used to analyse the collected interview data. The analysis process was conducted in stages following Braun and Clarke (2021), and involved the following steps: transcription of data, familiarization with the data gathered, initial coding, developing themes, and interpretation of findings. Thematic analysis helped the researcher to find the common patterns and significant meaning of technology-supported differentiated instruction and inclusive education. The results were analyzed in light of the research objectives and the context of education in Pakistan.

Findings and Results

Thematic analysis of the data obtained from the interviews showed four major themes for technology-enabled differentiated instruction for inclusive education in Pakistan. The results showed that technology offered great promise for individualized learning and inclusive classroom practices, while challenges and gaps in the implementation of technology were a factor in effectiveness.

Theme 1: Role of Educational Technology in Differentiated Instruction

The results showed that educational technology would help teachers differentiate instruction to personalize learning activities based on the student's ability, interest, and learning needs. Participants indicated that digital platforms, multimedia, and online learning resources enabled the teachers to adapt the content of teaching and learning and offer flexible learning paths. One teacher said, "Technology has enabled us to surpass the tradition of teaching, as students learn through videos, activities, and resources at their own learning speed" (P3). Special education teachers also reported that assistive technologies enhanced students with disabilities' participation through alternative means of accessing learning content. The findings confirmed the notion that technology enables multiple representations, engagements, and expressions for different

International "Journal of Academic Research for Humanities (JARH) 6(3)" types of learners.

Theme 2: Opportunities for Inclusive Education

Educational technology was recognized as an essential tool for enhancing accessibility and student engagement as well as improving flexibility in learning. Digital resources supported learners from various backgrounds, such as students with disabilities, and provided for them in a variety of formats. An educational technology expert explained: "Technological tools offer students who might have an impediment to learning in a traditional classroom multiple ways to access the learning materials (P17). Teachers also shared that interactive apps, videos, and digital collaboration tools motivated students and encouraged them to engage more in the classroom. The results indicated that technology-mediated learning settings created an inclusive environment through the ability to customize student access to content.

Theme 3: Challenges in the implementation of technology

Participants recognized that a number of barriers existed that hinder the effective implementation of educational technology, despite its benefits. Main obstacles reported were digital devices, low access to the internet, limited infrastructure, and technical support. A teacher said, "Technology can enhance learning, but there are many schools that need to make the necessary arrangements for effective digital learning" (P6). Participants also stated that teachers should engage in continuous professional development to build digital skills and to use technology in conjunction with differentiated teaching strategies. Other barriers to sustainable technology adoption include institutional constraints, financial constraints, and absence of maintenance systems.

Theme 4: Policy and strategic requirements

The results pointed to the necessity of implementing integrated policies for digital inclusion, investment in digital infrastructure, and teacher professionalization. Participants highlighted not only the importance of giving access to digital devices, but also to accessibility and equity in technology policies. An education

administrator stated, "A successful digital education policy must combine technology resources with teacher training and equal access opportunities" (P20). The major findings of the study were that, overall, educational technology supporting differentiated instruction has great potential to enhance the implementation of inclusive education in Pakistan, but it was observed that for the successful implementation of differentiated instruction through educational technology, coordinated efforts are needed, including infrastructure, capacity building, and supportive policy.

Discussion

The study findings indicated that the application of differentiated instruction through the use of educational technology has great potential to enhance inclusive education in Pakistan in terms of enhancing the accessibility, personalization, and participation of learners. The participants raised awareness of the teacher's ability to adapt the content of learning materials, offering flexible learning opportunities to students based on their abilities, interests, and learning needs, through the use of digital platforms, multimedia resources, and assistive technologies. This study aligns with earlier research which showed that EdTech can be used to improve the provision of accessible learning environments and to create adaptive educational experiences for a variety of learners in inclusive education (Lynch et al., 2022; Mintz et al., 2024). Likewise, UNESCO (2023) highlighted how technology can be used to facilitate educational inclusion if it is designed and implemented in a suitable manner, supported by the correct infrastructure, and prepared and trained teachers.

The results also provided evidence of the need for differentiated instruction as a tool for meeting the needs of learner diversity. They indicated that with the use of technology, differentiated approaches helped teachers deliver content in multiple ways, engage students, and assess them. The study result was in line with the previous studies, which had highlighted that the use of differentiated

instruction enhances motivation, involvement, and learning opportunities for various students as per their needs (Asif-Un-Nisa & Ambreen, 2020). Furthermore, studies in Pakistan have pointed out the role of differentiated instruction in creating learner's differences and facilitating their inclusion in the mainstream of learning in the classroom (Manzoor et al., 2022; Saif et al., 2024).

However, the findings indicated that several barriers restricted effective implementation of educational technology in Pakistan. Digital inequality, lack of infrastructure, low internet connectivity, and lack of teacher training and institutional support were identified as key challenges. These results were similar to previous research, which identified sustainability problems when implementing technology in inclusive education because of financial constraints, resource inequalities, and lack of teachers' competencies (Murillo-Jiménez et al., 2025; Castaño-Muñoz et al., 2025).

The results again highlighted the importance of policy frameworks that facilitate sustainable implementation of technology-supported differentiated instruction. The participants called for technology provision policies and teacher professional development, accessibility policies, policies on digital equity, and institutional policies. This is in line with UNESCO (2020, 2023), which emphasized the need for coordinated actions in three areas: technological access, capacity of teachers, and systemic educational reforms to maintain inclusive and equitable digital education. Hence, Pakistan needs to build policy pathways that link the integration of educational technology, differentiated pedagogy, and inclusive learning goals to develop equitable learning environments for all students.

Policy Implications and Recommendations

The results of this study revealed that there is a need for coordinated efforts of Government Institutions, Educational Institutions, and teachers to implement educational technology-based differentiated instruction for inclusive education in Pakistan. The government can

formulate inclusive, comprehensive educational technology policies that encompass digital accessibility, capacity building of teachers, and equitable learning opportunities. To close digital inequalities among learners, investment in digital infrastructure, reliable internet access, and affordable technology access are essential.

At the institutional level, educational institutions need to ensure adequate technological facilities, digital learning materials, and technical support systems. Periodically, institutions should organize training courses for teachers to improve the use of technology and to apply differentiated teaching methods to ensure inclusive teaching.

The teacher level of digital competency should continue to build digital skills and enhance technology integration into learner-centered pedagogies. They should provide differentiated learning approaches and make good use of assistive technologies to assist students with a wide range of learning needs. The collective efforts can play a role in inclusive education with sustainable and equitable technology in Pakistan.

Conclusion

This study found that educational technology has given a great deal of opportunities to enhance differentiated instruction and inclusive education in Pakistan. The results showed that digital platforms, multimedia, and assistive technologies helped teachers to tailor learning experiences based on students' varying abilities, learning preferences, and learning needs. Differentiated instruction through technology enabled increased access to learning and learner-centered learning experiences by providing multiple approaches to learning materials.

The study also found that through the provision of educational technology, learning was made more inclusive in the following ways: increased accessibility, participation, engagement, and personalized learning opportunities, especially for students who had difficulty in a traditional classroom environment. Digital resources and assistive technologies

facilitated learning for learners with disabilities and diverse learning needs and provided alternative means of access to and demonstration of knowledge.

However, the findings indicated that successful implementation of technology-supported inclusive education required addressing technological, pedagogical, and policy-related challenges. The implementation of educational technology in the educational context of Pakistan was hindered by a number of factors such as limited infrastructure, unequal access to digital resources, insufficient teacher training, and institutional constraints. Thus, technology can have no significance if teachers lack the necessary skills, institution would not be supportive, and the policy framework is not workable.

The study highlighted that efforts were needed to make educational technology inclusive for Pakistan and emphasized the need for coordinated and sustainable strategies involving the government, educational institutions, and teachers to maximize the benefits of educational technology for inclusive education. A suite of policies, which included digital equity, infrastructure, teacher preparation, and inclusive instructional practices, was needed to create effective technology-supported learning environments. Pakistan can progress towards an equitable and responsive educational system by combining the concepts of education technology with differentiated pedagogy and inclusive education.

Limitations and Future Research

There were a number of limitations to this study that need to be considered when interpreting the results. Firstly, the study comprised a small number of 20 participants only, which means that the results of the study cannot be generalized to the larger educational context of Pakistan. Second, the qualitative exploratory design was used to get detailed information about participants' experiences and perceptions, but did not allow for the establishment of statistical relationships or for generalizations to be made beyond the specific

educational contexts. Third, the study was centered around selected educational stakeholders; the views of a broader group of participants could lead to further understanding of technology-based inclusive education.

Future studies could be conducted in a large-scale quantitative manner, exploring the relationships between the use of educational technology, differentiated instruction approaches, and inclusive education results. The mixed-method research approach might also enhance our understanding by accessing statistical evidence as well as contextual experiences of teachers and learners. Moreover, a comparative study of the socio-economic landscape of urban and rural areas in different regions of Pakistan could identify contextual variations that can be utilized in designing better strategies in inclusive education through sustainable and technology-supported inclusive education.

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