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To Explore the Perceptions of Teachers on the Use of Educational Technology Tools Enhanced Assessment Methods in Supporting inclusive Education in Iringa Municipality, Tanzania

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ABSTRACT

Inclusive education is globally recognized as a fundamental right and a key strategy for advancing educational equity. However, traditional assessment practices often fail to accommodate the diverse needs of students, particularly students with intellectual disabilities, thereby limiting fairness and participation. This study examined the role of educational technology (EdTech) in enhancing assessment within inclusive secondary schools in Iringa Municipal Council, Tanzania. Guided by constructivist learning theory, the research employed a mixed-methods design those integrated surveys, semi-structured interviews and documentary reviews. Findings revealed that secondary teachers hold generally positive perceptions of EdTech, recognizing its potential to promote engagement, motivation and inclusivity through tools such as adaptive platforms, e-portfolios, screen readers and speech-to-text software. Despite this promise, challenges such as inadequate infrastructure, unreliable electricity, poor internet access, limited assistive devices and insufficient teacher training hinder effective implementation. Teachers emphasized the need for professional development, supportive policy frameworks and equitable access to resources to ensure sustainable adoption. The study concludes that EdTech-enhanced assessments can significantly improve inclusivity, but systemic investment and policy reforms are required to overcome structural barriers. Recommendations include strengthening ICT infrastructure, providing continuous teacher training, revising assessment policies to reflect inclusivity and fostering partnerships with NGOs and EdTech providers. Future study should explore the effectiveness of specific assistive educational technologies and innovative practices in low-resource contexts.

Keywords: Inclusive education, educational technology, assessment, teachers' perceptions, assistive technology, Tanzania

Title: Perceptions of Teachers on the Use of Educational Technology Tools Enhanced Assessment Methods in Supporting Inclusive Education

Introduction

Inclusive education has been globally recognized as a fundamental right and a critical driver of educational equity. It emphasizes providing meaningful learning opportunities for all students, including those with intellectual disabilities and diverse needs within mainstream classrooms (UNESCO, 2020). However, assessment remains a persistent challenge as traditional practices often rely on rigid, standardized methods that inadequately reflect students' diversity. This creates inequities in performance measurement and hinders full participation of marginalized groups (Bulut, 2024).

Educational technology has emerged as a powerful coordinator of inclusive assessment. Tools such as digital quizzes, adaptive platforms and e-portfolios introduce flexibility and interactivity into assessment practices (Chambers, 2020). These approaches support multiple modes of demonstrating knowledge and skills thereby accommodating students' variability. The study suggests that such educational technology-enhanced assessments increase engagement, motivation and accessibility, particularly for students with special educational needs (Karagianni and Drigas, 2023).

Assistive educational technologies provide further opportunities to promote inclusivity. Devices and software such as screen readers, speech-to-text applications and braille displays allow students with intellectual disabilities to access assessments equitably (Desideri *et al.*, 2023). These tools are consistent with Universal Design for Learning (UDL), which advocates multiple means of representation, engagement and expression (CAST, 2018 as cited in Wikipedia). By broadening participation assistive educational technology bridges gaps between students with and without intellectual disabilities.

Recent advancements in Artificial Intelligence (AI) and data-driven analytics have expanded the scope of educational technology-enhanced assessment. AI systems can provide adaptive testing, automated scoring and personalized feedback in real time supporting differentiated instruction (Bulut *et al.*, 2024). While these innovations hold promise they also raise concerns regarding fairness, transparency and ethical accountability, particularly in inclusive settings where vulnerable students disproportionately affected by algorithmic biases.

Evidence also highlights that supportive environment enhance adoption. When schools provide adequate infrastructure and professional development, teachers integrate tools such as interactive whiteboards, speech-to-text software and audiobooks more successfully, leading to improved student outcomes (RSIS International, 2023). Furthermore, global policy frameworks such as Sustainable Development Goal (SDG), four (4) underscore the importance of inclusive education and equitable education, further legitimizing the role of educational technology in transforming assessment (UNESCO, 2020).

Therefore, inclusive education depends on assessment methods that accommodate the diverse needs of all students, yet traditional practices often fail to achieve this goal. Educational technology provides flexible and interactive tools such as adaptive platforms, e-portfolios and assistive devices that enhance accessibility, engagement and motivation for students with intellectual disabilities. Also, advancements in Artificial Intelligent (AI) and data-driven analytics further enable personalized teaching and learning, though they also raise concerns about fairness, transparency and ethical accountability. Successful integration of these education technological tools requires adequate infrastructure, teacher training and alignment with educational policies, ensuring that educational technology supports equitable and meaningful assessment for all students.

Literature Review

Theoretical Framework

Constructivist learning theory emphasizes that, students actively construct knowledge through experience and social interaction (Piaget, 1972; Vygotsky, 1978). This perspective is directly relevant to educational technology-enhanced assessment in inclusive education as tools such as adaptive tests, digital portfolios and interactive quizzes allow students to engage meaningfully and demonstrate understanding in ways that accommodate diverse learning needs (Karagianni and Drigas, 2023). For students with intellectual disabilities, constructivist approaches supported by assistive educational technologies foster participation, supporting and self-directed learning which are central to inclusive education practices.

The constructivist focus on learner-centered assessment highlights the importance of teachers' perceptions in implementing educational technologies. Teachers serve as facilitators designing assessments that promote exploration, collaboration and critical thinking (Karagianni and Drigas, 2023). Investigating teachers' perceptions is therefore essential as their understanding of constructivist principles influences how effectively educational technology is utilized to support inclusive education through flexible and equitable assessment practices.

Empirical Review

Teachers' Perceptions of Educational Technology-Enhanced Assessments in Inclusive Education

The integration of educational technology tools into assessment methods is increasingly recognized as essential for promoting inclusive education. Teachers' perceptions are critical because they influence adoption, instructional strategies and student outcomes. The study indicates that teachers who perceive educational technology positively are more likely to experiment with innovative assessment practices that accommodate diverse learning needs. These perceptions also inform professional development priorities and policy decisions aimed at improving equity and accessibility in classrooms (Akram, 2022).

Educational technology tools can significantly enhance student engagement and academic performance. Navas-Bonilla (2025) highlighted that, interactive applications, mobile learning platforms and adaptive educational technologies enable personalized learning for students with intellectual disabilities. For instance, using tablet-based quizzes and interactive simulations can help students with visual or hearing impairments actively participate in assessments. Teachers reported that such educational technologies tools not only increase engagement but also help identify learning gaps, making it easier to design interventions connected to each student's unique requirements.

Despite the benefits, several challenges limit the use of educational technology in assessment. Polat (2024) noted that, inadequate education technological infrastructure, unreliable internet access and limited availability of assistive devices often restrict teachers' ability to implement digital assessments effectively. Additionally, teachers may feel unprepared or lack the confidence to use these tools, particularly when working with students who have complex learning needs. Such challenges can lead to inconsistent adoption of educational technology and reduce the overall effectiveness of inclusive assessment practices.

AI is increasingly being integrated into educational assessment to support diverse students. Yim (2024) found that, teachers' perceptions of AI-powered tools such as intelligent teaching systems and automated grading software are shaped by their understanding of AI and their belief in its reliability. Teachers reported that AI can help track individual student progress, suggest personalized learning paths and reduce administrative workload. However, concerns were raised about over-reliance on AI and potential impacts on teacher-student interaction, emphasizing the importance of blending AI tools with human guidance.

Professional development is critical for equipping teachers with the skills necessary to implement technology-enhanced assessments effectively. Atabek (2019) emphasized that, comprehensive training programs improve teachers' confidence and competence in using digital tools. Such programs include workshops on adaptive learning software, AI-based assessment platforms and inclusive education instructional strategies. Teachers who receive targeted training are better able to differentiate assessments, accommodate diverse students and integrate educational technology reliably into everyday classroom practice.

The use of educational technology in assessments raises ethical considerations related to fairness, equity and privacy. Bulut *et al.*, (2024) discussed concerns over algorithmic bias, data security and transparency in AI-based educational tools. Teachers reported that while educational technology can support inclusive education assessment, careful oversight is needed to ensure that it does not inadvertently disadvantage certain groups of students. Ethical use also requires maintaining human judgment in decision-making, ensuring that digital assessments complement rather than replace teacher evaluation and empathy.

Effective implementation of educational technology-enhanced assessments requires supportive policies, access to resources and inclusive design. Utami and Palacios-Hidalgo (2020) emphasized that, policymakers should provide sufficient infrastructure, digital content and professional development programs to help teachers adopt educational technology effectively. Additionally, educational technologies should be designed to accommodate students with disabilities, ensuring accessibility, usability and equity. Continuous monitoring and evaluation of educational technology-based assessment tools are essential to identify gaps, improve practices and maximize educational outcomes.

Research methodology

The research methodology used to examine the role of educational technology in enhancing assessment within inclusive education in Iringa Municipal Council. The study area was selected due to its relatively high number of public secondary schools implementing inclusive education and a significant population of students with intellectual disabilities. A mixed-methods approach was employed, combining qualitative and quantitative strategies to provide a comprehensive understanding of District education officer, Ward education officer, head teachers, teachers', students' and parents perceptions, experiences and challenges regarding educational technology-enhanced assessments.

The research design integrated a descriptive survey with an embedded case study approach, allowing for broad quantitative data collection through questionnaires and in-depth qualitative insights through semi-structured interviews. The sample included head teachers, teachers, students, parents and educational officers selected using purposive and simple random sampling techniques to ensure representativeness and inclusion of both decision-makers and direct beneficiaries. Documentary review complemented primary data by providing historical and contextual information from school records, policy documents and institutional reports.

Data were analyzed using SPSS version 21 for quantitative results and thematic analysis for qualitative responses with triangulation applied to enhance validity and reliability. Ethical considerations including informed consent, confidentiality and respect for participants' rights were strictly observed. Trustworthiness was ensured through credibility, dependability, confirmability and transferability. Overall, the methodology provided a robust and systematic framework to explore the integration, effectiveness and challenges of educational technology in assessment within inclusive education settings, yielding findings that are both context-specific and broadly applicable.

Findings

The study explored the perceptions of secondary school teachers regarding the use of educational technology (EdTech) tools to enhance assessment practices in inclusive education. Teachers play a central role in ensuring that assessment methods accommodate all students including those with intellectual disabilities. Understanding their views provided insight into the effectiveness, practicality and challenges of implementing educational technology-based assessment strategies in inclusive education.

Overall, the study findings revealed a generally positive attitude among teachers toward educational technology. Many participants highlighted those digital tools such as audio questions, visual materials, interactive quizzes and typed responses create more flexible and engaging assessment methods. For instance, one teacher explained:

Educational technology helps students, especially those with learning difficulties to participate better in assessments. When I use audio questions or let them type their answers, they perform with more confidence. But we don't always have the tools and most of us haven't been trained well on how to use them for inclusive education purposes (Interviewed Teacher F, June 2025).

Another teacher noted that:

Educational technology has really changed how we think about assessments. It gives room for creativity and supports students who struggle with the traditional exam formats. For instance, some of my students understand better through visual or audio materials. But the problem is we don't have enough devices and most of the time we have to share one computer among several students (Interviewed Teacher V, July 2025).

Despite this optimism participants emphasized several challenges that limit the effective use of educational technology in assessments. Limited access to devices, unreliable electricity, poor internet connectivity and lack of targeted training were repeatedly mentioned.

Furthermore, another teacher stated that:

We are aware that educational technology can improve assessment for all students but we struggle with limited resources. The computers we have are few and sometimes there's no electricity. Also, the training we received was general ICT nothing specific about supporting students with special needs during assessments (Interviewed Teacher S, July 2025).

Similarly, another teacher observed that:

Most of the training we received focused on basic computer skills, not on how to use educational technology to assess students with intellectual disabilities. That's why some of us still depend on traditional methods even when we know they are not the best for every student (Interviewed Teacher T, July 2025).

Teachers also highlighted the absence of clear policy guidance and insufficient support from education authorities as challenges to integrating EdTech into inclusive education assessments. They emphasized the need for structured professional development, access to adaptive educational technologies and collaboration between school leadership, government bodies and stakeholders to strengthen infrastructure and provide sustainable support.

Therefore, the study findings indicate that teachers recognize the significant potential of educational technology in promoting inclusive education assessment. They value its ability to provide flexible, accessible and engaging ways for students with diverse learning needs to demonstrate understanding. However, systemic challenges including limited resources, inadequate training and lack of policy support hinder effective implementation. The participants' views underscore a strong willingness among teachers to adopt EdTech-enhanced assessments, highlighting the need for targeted investment, professional development and institutional support to ensure inclusive education benefits from education technological advancements.

Discussion

The discussion of study findings highlights those teachers generally hold positive perceptions toward the use of educational technology (EdTech) in assessments, especially for supporting inclusive education. Teachers appreciate the efficiency of digital tools in managing large volumes of data, providing real-time feedback and enhancing instructional responsiveness (Johnson and Ahmed, 2023). Similarly, EdTech was found to increase accessibility for students with intellectual disabilities by offering features such as speech-to-text and screen readers, thereby promoting equity in assessments (Garcia and Lee, 2021).

However, teachers' perceptions varied depending on training and familiarity with digital tools. Professional development significantly improved teachers' confidence and optimism in using EdTech (Simmons and Raji, 2017). Despite these benefits, concerns remain about the validity of automated scoring systems for complex tasks, with many teachers preferring hybrid approaches that combine human judgment with digital efficiency (Kumar and Daniels, 2019).

Institutional support and infrastructure were also identified as critical factors shaping perceptions. Teachers in well-resourced schools reported more positive experiences, while those in under-resourced contexts expressed skepticism due to technical challenges (Mbogo, 2022). Furthermore, EdTech was perceived to increase student engagement, particularly through gamified and interactive assessments (Chen and Patel, 2020). Nonetheless, digital equity challenges such as unequal access to devices and internet connectivity continue to limit teachers' confidence in the fairness of educational technology-based assessments (Ochieng and Wambua, 2018).

Recent studies further emphasize the potential of adaptive educational technologies to improve participation for students with special needs (Nguyen and Patel, 2023) and highlight the role of EdTech in enhancing communication among stakeholders in inclusive education settings (Smith and Brown, 2023). Parental perspectives also indicate satisfaction with EdTech-assisted assessments but caution against excessive screen time (Juma and Mwita, 2019).

Overall, teachers' perceptions are shaped by access to infrastructure, professional development and alignment with curriculum and assessment policies. While EdTech enhances inclusivity, engagement and efficiency, challenges related to equity, training and reliability must be addressed to ensure sustainable adoption in inclusive education.

Summary

This study examined the role of educational technology in enhancing assessment in inclusive education in public secondary schools in Iringa Municipal Council, Tanzania. It was guided by three objectives, to identify the use of educational technology in assessing students with disabilities, to explore teachers' perceptions of educational technology-enhanced assessment and to examine the challenges faced in implementation. Findings showed that digital tools such as computer-based tests, audio-visual aids and assistive educational technologies like screen readers and speech-to-text software are gradually being used, but their adoption remains limited due to inadequate infrastructure, unreliable electricity, poor internet access and lack of assistive devices. Teachers held largely positive perceptions of educational technology, recognizing its potential to promote fairness, engagement and inclusivity. However, confidence in using these tools was strongly influenced by the level of training, ICT skills and school support. Challenges identified included overcrowded classrooms, insufficient resources, limited professional development and rigid assessment policies which constrained effective implementation.

Conclusion

The study concluded that educational technology plays a crucial role in promoting equity and improving assessment outcomes for students with intellectual disabilities in inclusive settings, but its integration in secondary schools is still underdeveloped. Teachers generally view educational technology positively, seeing it as a tool that fosters inclusivity and fairness, but practical barriers such as poor infrastructure, lack of resources and inadequate training hinder effective use. Therefore, systemic investment in ICT infrastructure, consistent teacher training and policy reforms are essential to strengthen inclusive education through educational technology-enhanced assessment.

Recommendations

Based on the findings the effective use of educational technology in inclusive education assessment, the study recommends to the authorities to strengthen ICT infrastructure by ensuring reliable electricity, internet connectivity and provision of appropriate assistive devices. Continuous teacher training and professional development should be prioritized to build confidence and ICT competence while school head teachers need to provide supportive environments that encourage innovation. Moreover, policies should be revised to allow flexible and inclusive assessment practices that accommodate diverse students' needs. Furthermore, partnerships with NGOs, EdTech companies and communities can help mobilize resources and expertise while linked support should be provided to students with intellectual disabilities, particularly those with intellectual challenges. Future study should also examine the effectiveness of specific assistive educational technologies, the influence of teacher demographics on perceptions and innovative strategies used in low-resource settings to promote inclusive education and equitable learning outcomes.

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