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Educational Tablets and their Effectiveness in Enhancing Teacher Engagement and Conceptual Understanding in History Instruction in Secondary Schools in Bagamoyo District, Tanzania

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Abstract: *Improving the quality of history instruction in secondary schools increasingly depends on the effective use of digital tools that enhance learner engagement and strengthen conceptual understanding. In Tanzania, educational tablets have been introduced in public secondary schools to support teaching and learning; however, their classroom application remains unclear, particularly regarding instructional practices and teacher preparedness in contexts such as Bagamoyo District. Although available, these devices are mainly used for supportive tasks, with limited evidence of meaningful pedagogical transformation in history education.This study assessed the effectiveness of educational tablets in enhancing teachers' engagement and conceptual understanding in history instruction in public secondary schools in Bagamoyo District. It examined how tablets are used in lesson preparation and delivery. A convergent parallel mixed-methods design was adopted, integrating quantitative and qualitative approaches. The study involved 30 participants, comprising 20 history teachers and 10 academic teachers, selected through stratified random and purposive sampling techniques. Data were collected using structured questionnaires and semi-structured interviews. Validity and reliability were ensured through triangulation, pilot testing, and a Cronbach's Alpha value of 0.72. Quantitative data were analyzed using descriptive statistics, while qualitative data were analyzed thematically using the constant comparative method supported by NVivo software. Findings indicate that tablets are strongly valued for lesson planning (80%) and digital exhibitions (64%), reflecting their usefulness in organizing and presenting instructional content. However, their integration into learner-centered strategies such as project-based learning remains limited (14%), with inconsistent use in historical timelines and classroom presentations. Challenges include inadequate pedagogical training, unclear policy direction, and insufficient technical support. The results correspond with the Technology Acceptance Model (TAM) and Technological Pedagogical Content Knowledge (TPACK), showing that although teachers recognize the usefulness of tablets, many lack the integrated competencies required for transformative instructional use.*

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INTRODUCTION

The integration of digital technologies into education has become a defining feature of contemporary pedagogical transformation, reshaping how knowledge is accessed, constructed, and transmitted across diverse learning contexts (Molnar, 2019; Warschauer & Zheng, 2020). Across global education systems, there is a discernible shift from traditional, teacher-centered approaches toward interactive, learner-centered pedagogies that emphasize critical thinking, collaboration, and conceptual understanding (Hennessy et al., 2022; Miller et al., 2021). Within this evolving landscape, educational tablets have emerged as versatile tools capable of enhancing instructional delivery through multimedia integration, real-time feedback, and interactive learning environments (Mavuso & Maphosa, 2021; Abah et al., 2022). However, despite their growing adoption, the pedagogical impact of tablets remains uneven, particularly in developing contexts where infrastructural limitations, insufficient training, and institutional constraints continue to hinder effective utilization (Ndung'u, 2020; Kamau & Wekesa, 2021).

History education provides a critical domain for examining the pedagogical value of educational tablets, given its emphasis on interpretation, contextualization, and critical analysis rather than mere factual recall (Wineburg, 2018). In many Tanzanian secondary schools, however, the teaching of history remains largely dominated by traditional methods characterized by rote memorization, textbook dependency, and limited learner engagement (Mabula, 2022; Mushi, 2021). Such approaches constrain both teachers' engagement with subject matter and students' ability to develop higher-order thinking skills. Educational tablets offer significant potential to address these limitations by enabling the use of multimedia resources such as interactive timelines, historical simulations, and digital archives, which can transform history lessons into dynamic and inquiry-driven experiences (Miller et al., 2021; Hennessy et al., 2022). As such, tablets have the capacity not only to enhance instructional techniques but also to deepen teachers' conceptual understanding and engagement with historical content.

The integration of educational tablets can be theoretically understood through the interplay of the Technology Acceptance Model (TAM) and constructivist learning theory. TAM posits that individuals' adoption of technology is influenced by their perceptions of its usefulness and ease of use, which in turn shape their attitudes and behavioral intentions toward its utilization (Venkatesh et al., 2021). In educational settings, this suggests that teachers are more likely to integrate tablets when they perceive them as enhancing instructional effectiveness. Complementing this perspective, constructivist learning theory emphasizes that knowledge is actively constructed through interaction, collaboration, and engagement with meaningful learning experiences (Vygotsky, 1978). Educational tablets align with this theoretical orientation by facilitating interactive and student-centered pedagogies, thereby enabling teachers to engage more deeply with content and support meaningful learning processes (Miller et al., 2021; Thomas & Brown, 2023). Together, these frameworks underscore that the effectiveness of tablets extends beyond access to their capacity to transform pedagogical engagement.

In the Tanzanian context, the integration of Information and Communication Technology (ICT) in education has been prioritized as a strategy for improving teaching quality and aligning with global educational trends (Mushi, 2021). Nevertheless, the practical implementation of such policies remains inconsistent, particularly in subjects like history

where digital integration is still emerging (Mabula, 2022). Existing studies have largely focused on the general impact of technology in education, with limited attention to how educational tablets specifically influence teachers' engagement and understanding of subject matter. This represents a critical gap, as teacher engagement is a key determinant of instructional quality and learning outcomes. Therefore, this study seeks to evaluate the effectiveness of educational tablets in enhancing teachers' engagement and conceptual understanding in history instruction within public secondary schools in Bagamoyo District, Tanzania. By providing context-specific evidence, the study contributes to bridging the gap between technological potential and pedagogical practice, offering insights for policymakers, educators, and stakeholders seeking to optimize the use of digital tools in education.

Theoretical Review

The theoretical foundation of this study is anchored in two complementary frameworks: the Technology Acceptance Model (TAM) and constructivist learning theory. These frameworks provide a robust lens for understanding both the adoption and pedagogical use of educational tablets in history instruction. While TAM explains the factors influencing teachers' acceptance and use of technology, constructivist theory elucidates how such technologies can transform teaching and learning processes by fostering active engagement and knowledge construction. The integration of these perspectives is particularly relevant in examining how educational tablets influence teachers' engagement and conceptual understanding in history education.

The Technology Acceptance Model (TAM), originally developed by Davis (1989), posits that the adoption and effective utilization of technological innovations are primarily determined by two key constructs: perceived usefulness and perceived ease of use (Venkatesh et al., 2021; Molnar, 2019). Perceived usefulness refers to the degree to which an individual believes that using a particular technology will enhance job performance, while perceived ease of use relates to the extent to which the technology is free of effort. In the context of education, these constructs are critical in shaping teachers' attitudes toward integrating digital tools such as educational tablets into their instructional practices (Warschauer & Zheng, 2020; Hennessy et al., 2022). Empirical studies have shown that teachers are more likely to adopt and effectively utilize tablets when they perceive them as facilitating lesson preparation, improving instructional delivery, and enhancing classroom engagement (Abah et al., 2022; Kamau & Wekesa, 2021). However, TAM also recognizes the influence of external variables, including training, infrastructure, and institutional support, which can either enable or constrain technology adoption (Mabula, 2022; Ndung'u, 2020). In this study, TAM provides a framework for understanding how teachers' perceptions of tablets influence their engagement with both the technology and the history content they teach.

Complementing TAM, constructivist learning theory offers a pedagogical perspective on how educational tablets can enhance teaching and learning processes. Rooted in the works of Piaget (1952) and Vygotsky (1978), constructivism posits that knowledge is actively constructed by learners through interaction, exploration, and social engagement rather than passively received from instructors. This theory emphasizes the importance of learner-centered environments where individuals engage with content, collaborate with peers, and reflect on their experiences to develop deeper understanding (Miller et al., 2021; Thomas & Brown, 2023). In history education, constructivist approaches are particularly valuable, as they

encourage students to analyze sources, interpret events, and construct historical narratives. Educational tablets align closely with these principles by providing interactive tools such as simulations, digital archives, multimedia presentations, and collaborative platforms that facilitate active learning (Mavuso & Maphosa, 2021; Moss & Vonck, 2020). For teachers, the use of tablets within a constructivist framework enhances their engagement with subject matter by enabling them to design more dynamic and inquiry-based lessons, thereby moving beyond traditional lecture-based approaches.

The integration of TAM and constructivist learning theory provides a comprehensive framework for analyzing the role of educational tablets in history instruction. While TAM explains the conditions under which teachers are likely to adopt and utilize tablets, constructivist theory explains how these tools can be used to enhance pedagogical engagement and conceptual understanding. Together, these frameworks highlight that the effectiveness of educational tablets depends not only on their availability but also on teachers' perceptions, competencies, and ability to integrate them into meaningful instructional practices (Venkatesh et al., 2021; Miller et al., 2021). In the context of Tanzanian secondary schools, where challenges related to infrastructure, training, and institutional support persist, this combined theoretical perspective is particularly useful for understanding both the opportunities and limitations of tablet integration. It underscores that for educational tablets to effectively enhance teachers' engagement and understanding in history, there must be alignment between technological acceptance and pedagogical application, supported by conducive institutional environments.

METHODOLOGY

This study adopted a mixed research approach that combined both qualitative and quantitative methods to gain a comprehensive understanding of how educational tablets influence instructional techniques and teacher preparedness in history education. The approach was appropriate because it allowed the study to both measure patterns of tablet use and explore teachers' lived experiences in the classroom. A convergent parallel mixed-methods design was applied, whereby qualitative and quantitative data were collected simultaneously, analyzed separately, and then merged during interpretation. Qualitative data were obtained through semi-structured interviews with history and academic teachers to explore experiences, challenges, and instructional practices, while quantitative data were gathered through structured questionnaires administered to history teachers to capture the extent and perceived effectiveness of tablet use. The target population included history teachers, academic teachers, school administrators, and relevant educational documents such as lesson plans and ICT policy guidelines, all within public secondary schools in Bagamoyo District, a context selected for its historical significance and increasing engagement with educational technologies.

The study employed both stratified random sampling and purposive sampling techniques to ensure a balance between representativeness and depth. Stratified random sampling was used to select history teachers for the quantitative component, ensuring fair representation across selected schools, while purposive sampling was applied to identify key informants such as experienced history teachers and academic teachers for qualitative insights. A total of 30 participants were involved, comprising 20 history teachers and 10 academic teachers. Data were collected using semi-structured interviews and structured questionnaires,

with interviews providing detailed qualitative insights and questionnaires generating measurable quantitative data on tablet usage and effectiveness. To ensure validity, the research instruments were developed based on study objectives and existing literature, supported by triangulation and a pilot study conducted outside the study area to refine tools. Reliability was strengthened through standardized procedures, consistent data collection methods, and internal consistency testing using Cronbach's Alpha, with a reported alpha of 0.72.

Data analysis followed a systematic process in which quantitative data were analyzed using descriptive statistics such as frequencies, percentages, and means, while qualitative data were analyzed thematically using the constant comparative method with the support of NVivo software. After separate analyses, the two datasets were merged to enable comparison and integration of findings, enhancing the depth and credibility of interpretation through triangulation. Ethical standards were strictly observed throughout the study, including obtaining informed consent, ensuring voluntary participation, maintaining confidentiality through anonymity, and securing ethical clearance from the relevant Institutional Review Board as well as permissions from district and school authorities. Member checking was also used to validate interview data and ensure accuracy in interpretation, thereby strengthening the trustworthiness and integrity of the research process.

RESULTS AND DISCUSSIONS

This study set out to evaluate the effectiveness of educational tablets in enhancing teachers' engagement and conceptual understanding in history instruction within public secondary schools in Bagamoyo District, Tanzania. The findings reveal a complex and uneven pattern of technology integration, characterized by high perceived value but differentiated levels of pedagogical application. Overall, the results indicate that while teachers recognize the potential of tablets to improve instructional practices, their use remains concentrated in specific domains, particularly lesson planning and structured multimedia applications. This suggests that the pedagogical transformation associated with digital technologies is still in a transitional phase, shaped by both enabling and constraining contextual factors.

From a statistical perspective, the data demonstrate clear trends in teachers' perceptions of effectiveness across different instructional strategies. The most significant positive outcome was observed in efficient lesson planning, where 80% of respondents (50% strongly agree; 30% agree) indicated that tablets enhance their ability to prepare lessons. This high level of agreement suggests that tablets are primarily utilized as organizational and resource-access tools, supporting teachers' professional tasks rather than fundamentally transforming pedagogical approaches. Similarly, digital exhibitions recorded strong positive responses, with 64% of teachers (27% strongly agree; 37% agree) acknowledging their effectiveness. These findings indicate a preference for structured, presentation-oriented uses of technology, which are relatively easier to implement within existing pedagogical frameworks.

In contrast, more pedagogically transformative applications such as project-based learning exhibited significantly lower adoption rates. Only 14% of respondents (7% strongly agree; 7% agree) reported using tablets to support project-based learning, while an overwhelming 87% disagreed. This stark disparity highlights a critical gap between the theoretical potential of educational technologies and their practical implementation. From an

inferential standpoint, this pattern suggests that teachers are more likely to adopt low-risk, teacher-centered applications of technology than high-engagement, student-centered approaches that require greater pedagogical shift and institutional support. Similar trends have been reported in global studies, where teachers often use digital tools to reinforce existing practices rather than to transform them (Warschauer & Zheng, 2020; Hennessy et al., 2022). This phenomenon, often described as "technological substitution" rather than "pedagogical transformation," underscores the importance of addressing deeper systemic and professional development challenges.

The findings related to historical timelines further reinforce this interpretation. While 40% of teachers (13% strongly agree; 27% agree) reported using tablets for timeline-based instruction, a larger proportion (43%) did not adopt this approach, and 17% declined to respond. This indicates moderate but inconsistent integration of visualization tools, despite their well-documented effectiveness in enhancing conceptual understanding. Qualitative evidence suggests that teachers who utilized digital timelines observed improved student engagement and comprehension, supporting constructivist assertions that interactive and visual learning enhances knowledge construction (Vygotsky, 1978). However, the relatively low adoption rate suggests that the capacity to translate technological affordances into pedagogical practice remains limited.

The use of tablets for lesson presentations also revealed constrained adoption, with only 34% of teachers (7% strongly agree; 27% agree) reporting positive use, compared to 27% who disagreed and a notable 40% who declined. This distribution suggests not only limited utilization but also possible uncertainty or lack of confidence among teachers in using tablets for instructional delivery. This finding contrasts with evidence from developed contexts, where tablet-supported presentations are widely adopted and associated with increased teacher engagement and improved instructional quality (Mavuso & Maphosa, 2021; Miller et al., 2021). The divergence highlights the influence of contextual factors, particularly access to training and digital resources, in shaping technology use.

A critical dimension emerging from the findings relates to institutional and policy constraints. Notably, 44% of respondents (17% strongly agree; 27% agree) indicated that lack of clear policies hinders effective tablet integration, while 37% declined to respond, suggesting uncertainty or limited awareness of existing guidelines. This finding is consistent with broader research in sub-Saharan Africa, which identifies weak policy frameworks and inadequate institutional support as major barriers to effective ICT integration (Gakio, 2021; Mushi, 2021). From a systems perspective, this implies that technological interventions cannot succeed in isolation but require alignment with policy, infrastructure, and professional support mechanisms.

When situated within global scholarship, the findings of this study both align with and diverge from existing literature. Consistent with studies conducted in developed contexts, the results confirm that educational tablets can enhance teacher engagement, improve access to instructional resources, and support interactive teaching methods (Warschauer & Zheng, 2020; Miller et al., 2021). However, unlike in high-resource settings where technology integration often leads to pedagogical transformation, the findings from Bagamoyo indicate a more incremental and constrained impact. This divergence can be attributed to contextual challenges, including limited infrastructure, insufficient training, and lack of sustained

institutional support, which continue to shape the scope and effectiveness of technology use in developing contexts (Ndung'u, 2020; Kamau & Wekesa, 2021).

Theoretically, the findings provide strong support for both the Technology Acceptance Model (TAM) and the Technological Pedagogical Content Knowledge (TPACK) framework. The high levels of agreement regarding lesson planning and digital exhibitions suggest that teachers perceive tablets as useful and relatively easy to use, consistent with TAM's core constructs (Venkatesh et al., 2021). However, the limited adoption of more complex pedagogical applications indicates gaps in technological pedagogical content knowledge, as conceptualized by Koehler and Mishra (2009). In other words, while teachers may accept and use technology, they may lack the integrated knowledge required to apply it effectively within specific disciplinary contexts such as history.

Furthermore, the findings reinforce constructivist perspectives on learning, particularly the importance of active and interactive engagement in knowledge construction. The positive outcomes associated with digital exhibitions and qualitative insights from project-based learning demonstrate that when tablets are used to support collaborative and inquiry-based approaches, they can significantly enhance both teacher engagement and student learning. However, the limited adoption of such approaches suggests that the shift toward constructivist pedagogy remains incomplete, constrained by both structural and cognitive factors.

In summary, the results reveals that educational tablets have considerable potential to enhance teachers' engagement and understanding in history education, but this potential is unevenly realized. Statistical trends indicate strong utilization in areas aligned with traditional pedagogical practices, while more transformative applications remain underdeveloped. The findings highlight the need for a more holistic approach to technology integration one that goes beyond access to devices and addresses teacher capacity, pedagogical innovation, and institutional support. Bridging this gap is essential for moving from superficial adoption to meaningful pedagogical transformation, thereby enabling educational tablets to fully realize their potential in enhancing history instruction.

CONCLUSION

Educational tablets demonstrate clear potential to enhance history instruction by improving teachers' access to instructional materials, supporting lesson preparation, and strengthening classroom presentation practices. In many cases, teachers report increased efficiency in organizing content and delivering lessons, particularly when using multimedia and structured digital resources. However, the use of these devices remains largely concentrated in supportive and teacher-centered functions rather than extending into more interactive or learner-driven approaches. As a result, while tablets are becoming part of everyday teaching practice, their influence on transforming how history is taught and learned remains limited.

A key issue shaping this pattern is the gap between availability of technology and teachers' ability to integrate it meaningfully into pedagogy. Many teachers appear more comfortable using tablets for tasks that complement existing teaching methods rather than redesigning instruction around student participation, inquiry, and collaboration. Limited confidence in applying advanced digital strategies, combined with insufficient exposure to constructivist teaching models, restricts the extent to which tablets are used for activities such

as project-based learning, critical historical analysis, or interactive timelines. Institutional factors, including unclear guidance and uneven technical support, further contribute to cautious and conservative patterns of use.

Improving this situation requires a shift in focus from simply providing devices to strengthening the ecosystem that supports their educational use. Continuous professional development that emphasizes practical classroom integration, rather than basic technical training alone, would help teachers expand their pedagogical use of tablets. Stronger school-level support systems, clearer implementation frameworks, and improved infrastructure such as reliable internet and technical assistance would also enhance consistency in use. Encouraging collaboration among teachers through shared practices and peer learning, alongside embedding digital pedagogy in teacher education programs, would further build confidence and innovation. Sustained attention to these areas would help ensure that educational tablets move beyond supportive tools and become instruments for deeper engagement and improved conceptual understanding in history education.

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