



Government-Provided Tablets and AI-Supported Teaching Practices in Rural Tanzania: Evidence From Public Secondary Schools in Kilindi District

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Abstract : Tablets and artificial intelligence (AI) are expanding access to instructional resources, yet rural schools often lack the competence, connectivity, maintenance, and institutional support needed for use. This study examined how government-provided tablets and AI tools influence teaching practices in public secondary schools in Kilindi District, Tanzania. Its main objective was to determine their influence on lesson preparation, instructional delivery, resource access, learner engagement, and assessment. A mixed-methods approach used a descriptive, convergent parallel design. The sample comprised 108 respondents: 99 teachers selected through simple random sampling and nine heads of schools selected purposively. Data were collected concurrently with structured questionnaires and semi-structured interviews after institutional permission and informed consent. Quantitative data were summarized using frequencies and percentages; interview and open-ended responses were coded thematically, then merged with quantitative results for triangulation. Expert review supported content validity, while pilot testing outside the study sample strengthened instrument reliability. Participation was voluntary, confidentiality was protected, and respondents could withdraw. Tablets and AI were perceived to improve lesson preparation and instructional delivery (73.2% each) and access to diverse teaching and learning materials (67.7%). Qualitative evidence additionally identified improved teaching methods, time savings, engagement, and assessment support. Benefits were nevertheless constrained by non-functional devices, inadequate AI training, poor connectivity, high data costs, weak technical support, and unequal access. The study concludes that device provision can improve teaching only when embedded in a functional digital ecosystem. It recommends continuous practice-based AI professional development, reliable connectivity, equitable device allocation, and funded maintenance and technical-support systems.

Keyword : artificial intelligence; digital pedagogy; government-provided tablets; rural secondary schools; teaching practices; Tanzania

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INTRODUCTION

Digital technologies now mediate lesson planning, content access, assessment, feedback, and classroom interaction, while generative and analytical forms of artificial intelligence (AI) widen the range of tasks that teachers can perform with a connected device. Yet the educational value of technology remains conditional. The 2023 Global Education Monitoring Report identifies access, governance, and teacher preparation as system-wide requirements for technology to fulfil its educational potential (Global Education Monitoring Report Team, 2023). Recent AI evidence likewise reports opportunities for personalization, assessment, resource generation, and instructional decision-making, alongside concerns about reliability, bias, ethics, and overdependence (Bond et al., 2024; Celik et al., 2022; Crompton et al., 2024). UNESCO's human-centred guidance therefore frames AI as a support for teachers' agency and professional judgement, not a substitute for them (Miao & Cukurova, 2024; UNESCO, 2023).

These conditions are especially consequential in Africa, where digital tools may ease shortages of print materials and expand professional learning but are frequently introduced into schools with uneven electricity, connectivity, device maintenance, and technical support. In Tanzania, policy and programme activity increasingly links secondary education reform to

digitally enabled teaching. The Secondary Education Quality Improvement Project supports teacher continuous professional development and digital resource delivery, while a 2024 skills gap analysis still documented insufficient infrastructure, unequal device access, limited connectivity, and a need for training on emerging technologies such as AI (Butcher et al., 2024). More recent national implementation of the 2025 ICT Competency Standards for Teachers has reinforced practical training in digital pedagogy (UNESCO, 2026). Current Tanzanian studies similarly show that teachers generally value tablets and digital tools, but that actual classroom use depends on competence, school support, internet access, and functional equipment (Baha et al., 2026; Mwakapemba et al., 2024; Njiku et al., 2025).

Evidence remains limited, however, on what occurs after government-provided tablets reach rural public secondary schools and become possible gateways to AI-supported work. Much international AI-in-education research concerns higher education or technologically advantaged settings, whereas Tanzanian studies have commonly examined ICT competence or technology acceptance in general. This leaves a contextual and conceptual gap concerning whether government-issued tablets are associated with observable changes in teachers' preparation, delivery, access to

resources, engagement strategies, and assessment practices in districts such as Kilindi. The present study therefore examined the perceived influence of government-provided tablets and AI tools on teaching practices in selected public secondary schools in Kilindi District. By integrating teacher survey evidence with heads of schools' accounts, the article contributes rural Tanzanian evidence to debates about the conditions under which device provision becomes pedagogically meaningful.

Literature Review

1. Theoretical Review

The Technology Acceptance Model (TAM) provides the principal theoretical lens. Davis (1989) proposed that technology use is shaped mainly by perceived usefulness, or the belief that a system improves job performance, and perceived ease of use, or the belief that it can be used with limited effort. Applied to teaching, the model predicts that teachers are more likely to use government-provided tablets and AI applications when they believe the tools improve lesson preparation, instructional delivery, resource access, or assessment, and when operating them is manageable within everyday school conditions. The model is appropriate here because it connects teachers' reported pedagogical benefits to their willingness and ability to integrate the technology.

TAM also clarifies why provision and use should not be treated as equivalent. A tablet may appear useful but remain unused when it is damaged, shared, difficult to navigate, or disconnected from affordable internet. The extended TAM and the Unified Theory of Acceptance and Use of Technology show that experience, social influence, and facilitating conditions can shape intention and actual use (Venkatesh & Davis, 2000; Venkatesh et al., 2003). In school settings, competence, confidence, professional learning, leadership, technical support, and access to curriculum-relevant content affect whether perceived usefulness becomes sustained practice (Ertmer & Ottenbreit-Leftwich, 2010).

For this study, TAM is interpreted as an embedded rather than purely individual model of acceptance. Perceived usefulness is reflected in reported gains in planning, delivery, access, efficiency, engagement, and assessment. Perceived ease of use is affected not only by interface simplicity but also by device functionality, data costs, connectivity, training, maintenance, and institutional support. This interpretation avoids blaming teachers for low use when the operational environment makes use difficult. It also aligns with UNESCO's AI competency approach, which combines human-centred values, ethics, technical knowledge, pedagogy, and professional learning (Miao & Cukurova, 2024).

Empirical Review

International syntheses indicate that AI can help teachers generate or locate materials, provide feedback, monitor learning, personalize activities, and support assessment. However, the evidence base is geographically uneven and often concentrated in higher education, with limited attention to teachers and school-level implementation (Bond et al., 2024; Crompton et al., 2024). A systematic review focused on teachers found that AI's promises are commonly paired with concerns about pedagogical knowledge, ethics, transparency, and the need for professional development (Celik et al., 2022). These reviews imply that benefits reported in well-resourced settings cannot be assumed in rural secondary schools without examining the conditions of use.

African and Tanzanian research reinforces this conditional relationship. Persistent infrastructure and support constraints in sub-Saharan Africa can limit classroom technology even when teachers are motivated (Hennessy et al., 2010). In Tanzania, Kalinga and Ndibalema (2023) identified technological competence as central to effective secondary teaching, while Ngao and Sang (2024) showed that professional learning communities can strengthen ICT integration through collaboration and practice-based learning despite constraints at school and system levels. A national mixed-methods study further found moderate

knowledge and perceptions of technology integration and recommended sustained pre-service and in-service capacity building (Njiku et al., 2025).

Tablet-specific evidence is now emerging. Mwakapemba et al. (2024) reported generally favourable Tanzanian teacher perceptions while emphasizing knowledge, school-environment support, sustainability, and acceptance. In Karatu District, Baha et al. (2026) found that teachers used tablets mainly to search for materials and support teaching, but 67% had received no formal tablet training and participants faced connectivity and technical problems. These studies confirm the value of studying access, competence, and infrastructure together, but they do not resolve how tablet-enabled AI relates to specific teaching practices in rural Kilindi. The present convergent mixed-methods study addresses that gap by linking a small set of verified descriptive indicators with contextual explanations from teachers and heads of schools.

METHODOLOGY

The study used a mixed-methods approach and a descriptive convergent parallel design. Quantitative and qualitative data were collected during the same field phase, analysed separately, and merged during interpretation so that numerical patterns could be compared with participants' explanations (Creswell &

Creswell, 2018). The design was appropriate for documenting the reported influence of government-provided tablets and AI on existing teaching practices; it was not designed to estimate a causal treatment effect. The study was conducted in public secondary schools in Kilindi District, Tanzania. The target population comprised 457 teachers and school-level education personnel across 26 secondary schools.

The final sample comprised 108 respondents: 99 classroom teachers and nine heads of schools. Simple random sampling was used to select teachers, whereas heads of schools were selected purposively because their administrative roles gave them direct knowledge of implementation, device management, and classroom use. The minimum teacher sample was estimated from a population of 404 teachers using Yamane's (1967) formula at a 10% margin of error; the achieved teacher sample exceeded the calculated minimum of 80. Structured questionnaires collected quantitative and open-ended responses from teachers, and semi-structured interview guides were used with heads of schools.

After permissions were obtained from relevant educational authorities and school administrations, questionnaires were administered to participating teachers and face-to-face interviews were conducted with heads of schools. Quantitative data were analysed with descriptive statistics,

principally frequencies and percentages. Qualitative data were transcribed, read repeatedly, coded, grouped into themes, and interpreted; the two strands were then compared for convergence, complementarity, or divergence. Item-level valid denominators varied because of missing responses, so percentages are reported against valid responses where the source results permit.

Content validity was supported through expert review and academic supervision, focusing on clarity, relevance, coverage, and alignment with the study objective. Reliability was strengthened through pilot testing in a secondary school outside the study sample; ambiguous items were revised before the main data collection. Ethical safeguards included institutional permission, informed consent, voluntary participation, the right to withdraw, confidential handling of responses, and use of data solely for academic purposes. No participant names or school-identifying quotations are reported in this article.

FINDINGS AND DISCUSSION

Perceived Pedagogical Gains

The major finding was that teachers perceived government-provided tablets and AI tools as useful for preparation, delivery, and access to instructional resources, but these gains were conditional on functional devices, competence, connectivity, and support. The strongest verified survey results were identical positive ratings for

improved lesson preparation and instructional delivery (73.2% each), followed by improved access to diverse teaching and learning materials (67.7%). The qualitative strand explained what these percentages meant in practice: teachers described faster searches for textbooks, notes, maps, videos, and examples; more varied teaching methods; and quicker preparation of exercises and quizzes. Table 1 retains only the evidence most directly relevant to the selected objective.

Table 1.
Verified evidence on the reported influence of tablets and AI on teaching practices

Teaching-practice indicator	Quantitative evidence	Qualitative evidence
Lesson preparation	73.2% positive	20 mentions of improved preparation
Instructional delivery	73.2% positive	23 mentions of improved teaching methods
Access to diverse materials	67.7% positive	33 mentions of improved resource access
Instructional efficiency	No verified percentage reported	22 mentions of time savings

Engagement and assessment	No verified percentage reported	13 engagement and 6 assessment mentions
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Note. Positive responses combine agree and strongly agree. Quantitative percentages use valid item responses; qualitative counts are coded mentions and are not mutually exclusive.

Interpretation and Triangulation

Lesson preparation and delivery were the clearest areas of perceived influence. Teachers reported using tablets to search for curriculum-related material, assemble notes, identify examples, and prepare visual or interactive resources. Heads of schools similarly observed better preparation and more varied classroom instruction among active users. This convergence matters because it connects a broad Likert-scale judgement to concrete professional tasks. It also accords with Baha et al. (2026), whose respondents used tablets primarily for teaching and information searching, and with Mwakapemba et al. (2024), who found strong perceived usefulness and acceptance of tablets among Tanzanian teachers. The Kilindi evidence therefore supports a cautious claim of perceived pedagogical value, not a causal claim that the devices alone produced better teaching.

Access to diverse resources was the third strong result. Thirty-three open-ended responses identified improved access to teaching and learning materials, the largest

qualitative theme in this objective. Tablets functioned as portable entry points to resources that may be scarce in rural schools, while AI reduced the time required to search, summarize, draft, or adapt material. Twenty-two responses specifically mentioned time savings. These findings match international reviews that identify resource generation, feedback, assessment, and personalization as recurrent AI affordances (Bond et al., 2024; Celik et al., 2022). They also explain the high perceived usefulness component of TAM: teachers valued the technology because it addressed immediate, repetitive tasks in their work.

The evidence for learner engagement and assessment was positive but less extensive. Thirteen respondents described greater attention or participation when digital materials were used, and six mentioned improved assessment practices. Teachers reported preparing quizzes and exercises with AI-supported tools, while heads of schools associated digital materials with more interactive lessons. A precise percentage for the questionnaire's assessment item is deliberately not reported because the source dissertation identified inconsistent frequencies for that item. This editorial decision prevents false precision and keeps the article's claims within the verified evidence.

The positive pattern was not universal. Only 27.8% of 90 valid respondents agreed that their tablets

were in good working condition; 59.1% of 93 valid respondents agreed that tablets supported AI integration, and regular tablet use was lower than reported availability. Across the wider results, 87.8% reported no adequate AI-specific training, 86.8% agreed that poor connectivity affected use, and 83.8% agreed that inadequate institutional support constrained AI integration. Interview and open-ended evidence added high data costs, weak electricity, delayed repair, limited technical assistance, and unequal distribution to newly recruited teachers. Thus, the same teachers could recognize substantial pedagogical value while being unable to use the technology consistently.

This conditionality is consistent with recent Tanzanian evidence. Baha et al. (2026) likewise found widespread use for resource searching and teaching alongside limited formal training, internet constraints, and technical problems. Ngao and Sang (2024) showed that collaboration and practice-based professional learning can strengthen integration when formal resources are limited, while Njiku et al. (2025) found that knowledge and perceptions alone do not fully predict actual technology use. The continuing national emphasis on ICT competency modules and continuous professional development is therefore well directed, but the Kilindi findings indicate that training must be accompanied by device repair, connectivity, and local

support (Butcher et al., 2024; UNESCO, 2026).

TAM helps integrate these results. The strong ratings for planning, delivery, and resource access indicate perceived usefulness. Low functionality, inadequate training, and poor connectivity reduce perceived and practical ease of use. In this context, acceptance is not simply a teacher attitude; it is produced through the interaction of teacher competence with material and institutional conditions. The findings therefore extend a narrow individual reading of TAM by showing how facilitating conditions determine whether favourable perceptions become routine practice (Venkatesh et al., 2003). They also support a human-centred approach in which AI augments teachers' judgement. Seven respondents warned that uncritical dependence could weaken creativity or critical thinking, echoing UNESCO's call for ethical, evaluative, and pedagogical AI competence (Miao & Cukurova, 2024; UNESCO, 2023).

Because the study is cross-sectional, descriptive, and largely self-reported, the results should be interpreted as perceived influence rather than measured changes in student achievement or experimentally established effects. The sample is specific to selected public secondary schools in one rural district, and item-level nonresponse produced varying denominators. Nevertheless, convergence among teacher survey responses, open-ended explanations,

and heads of schools' interviews strengthens the central inference: tablets and AI can support teaching practices, but their value is realized through a functioning digital ecosystem rather than through distribution alone.

CONCLUSION AND RECOMMENDATIONS

Government-provided tablets have created a credible platform for AI-supported teaching in Kilindi District. Teachers most clearly associated the devices with better lesson preparation and instructional delivery, wider access to materials, and greater efficiency; smaller but consistent qualitative themes concerned learner engagement and assessment support. The contribution of the study is therefore not the simple claim that tablets improve teaching. Rather, it shows that perceived usefulness can coexist with irregular use when devices are damaged, connectivity is poor, AI competence is limited, and technical or institutional support is weak. In rural secondary education, digital provision becomes pedagogical improvement only through the alignment of functional technology, competent teachers, affordable infrastructure, and supportive institutions.

Policy and practice should consequently move from one-off device distribution to lifecycle support. Government and district authorities should fund timely repair and replacement, ensure newly recruited

teachers receive functional devices, and expand reliable school connectivity or affordable education data arrangements. Continuous professional development should be practical and subject-based, enabling teachers to use AI for planning, resource adaptation, engagement, and assessment while checking accuracy, bias, curriculum alignment, and learner suitability. Heads of schools should organize peer coaching and professional learning communities, monitor device functionality and use, and connect teachers with local technical support. Future research should combine classroom observation, usage logs, and learner outcomes with teacher reports, use larger multi-district samples, and apply longitudinal or quasi-experimental designs to test whether the perceived benefits identified here translate into sustained changes in instruction and learning.

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