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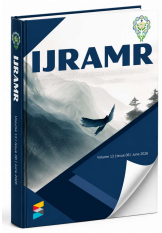

REVIEW ARTICLE

INTEGRATING ELECTRONIC MUSIC DEVICES INTO LOWER SECONDARY SCHOOL MUSIC EDUCATION IN GULU CITY, UGANDA: PEDAGOGICAL AFFORDANCES, INFRASTRUCTURE CHALLENGES, AND EMERGING HYBRID MODELS

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ABSTRACT

Background: Electronic music devices are reshaping music pedagogy globally, yet evidence on their deployment in post-conflict urban settings in sub-Saharan Africa remains scarce. Lower secondary schools in Gulu City, Northern Uganda, have begun acquiring digital keyboards and music software, yet systematic evidence on their pedagogical deployment, affordances, and structural barriers to effective use is absent from the literature. **Objectives:** This study investigated the pedagogical affordances of electronic music devices in lower secondary school music education in Gulu City, identified infrastructure challenges constraining their integration, and examined hybrid instructional models constructed by teachers and community musicians. **Methods:** A qualitative mixed-methods design was employed. Purposive sampling was used to select five lower secondary schools in Gulu City. Data were collected through semi-structured interviews with twelve music teachers, four focus group discussions with sixty students across Senior One to Senior Four levels, structured interviews with five school administrators, and key informant interviews with four community musicians. Thematic analysis guided data organisation and interpretation, cross-referenced against the Technology Acceptance Model and constructivist learning theory. **Results:** Three themes emerged. First, electronic devices expanded students' creative and compositional capacities and enhanced multimodal engagement, though pedagogical value was mediated by teacher competence and instructional intent. Second, unreliable electricity supply, inadequate maintenance budgets, and limited internet connectivity constituted persistent structural barriers that truncated the devices' instructional potential. Third, teachers and community musicians were collaboratively constructing hybrid models that wove digital tools with traditional Acholi musical practices, producing culturally responsive and contextually adaptive pedagogical approaches. **Conclusions:** Electronic music devices hold genuine promise for transforming lower secondary music education in Gulu City when embedded within sound pedagogical frameworks, supported by adequate infrastructure, and anchored in local cultural knowledge. Targeted investment in school electricity, in-service teacher training, and formalised community musician partnerships are recommended.

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INTRODUCTION

Music education in sub-Saharan African secondary schools is undergoing a quiet but consequential transformation. Across the region, electronic music devices including digital keyboards, computers installed with audio software, Musical Instrument Digital Interface (MIDI) controllers, loop stations, and smartphones loaded with music applications are entering classrooms that were, until recently, equipped only with acoustic instruments and chalkboards (1,2). This technological infusion carries significant pedagogical promise: electronic devices can expand students' compositional capacities, support multimodal engagement, and create new pathways for musical creativity that align with competence-based curriculum frameworks increasingly adopted across the continent (3,4).

Yet the conditions under which these devices are deployed, and the extent to which they genuinely enhance learning, remain incompletely understood particularly in low-resource post-conflict settings where infrastructure gaps and cultural dynamics complicate straightforward adoption narratives (5,6). Uganda's lower secondary curriculum, introduced through the Revised Lower Secondary Curriculum of 2020, emphasises competence-based learning across all subjects, including music (4). The curriculum explicitly calls for learners to develop practical musical skills, creative expression, and cultural appreciation goals that electronic music devices, in principle, are well-positioned to support (4,5). In practice, however, the integration of these devices into Ugandan secondary school music classrooms is uneven, contested, and structurally constrained. Teachers report enthusiasm for the

devices but lack the professional preparation to deploy them pedagogically (6,7). Administrators acknowledge their value but struggle to maintain functioning equipment in the face of unreliable electricity and limited maintenance budgets (7,8). Students engage eagerly with the devices but frequently encounter institutional barriers that interrupt sustained learning (9,10). Gulu City presents a distinctive and underexplored case. Located in Northern Uganda, Gulu was the epicentre of the Lord's Resistance Army conflict that displaced over 1.8 million people between 1987 and 2006. The post-conflict reconstruction of the city's education sector has been rapid but uneven, producing schools that simultaneously aspire to technological modernity and contend with persistent infrastructure deficits (9,10). Within this context, music teachers and community musicians from the Acholi cultural tradition have begun constructing innovative hybrid instructional models that blend digital tools with indigenous musical knowledge an approach that has received no systematic empirical attention to date. This study addresses that gap, guided by two research questions: What pedagogical affordances do electronic music devices offer in lower secondary school music education in Gulu City, and what infrastructure challenges and hybrid models characterise their integration?

Theoretical Framework: Two theoretical frameworks guide this study. The Technology Acceptance Model (TAM), originally developed by Davis (11) to explain user adoption of information systems, provides a lens for understanding how music teachers and students perceive and respond to electronic music devices. TAM posits that perceived usefulness the degree to which a technology is believed to enhance performance and perceived ease of use the degree to which a technology is believed to require minimal effort are the primary determinants of adoption intention and actual use (11,12). Applied to music education, TAM has been used to examine teachers' intentions to adopt digital tools, multimedia learning platforms, and music applications, consistently demonstrating that these two constructs predict adoption behaviour across diverse educational contexts (13,14). In the present study, TAM informs the analysis of how teachers and students conceptualise the value and accessibility of electronic devices, and how those perceptions shape pedagogical decisions.

Constructivist learning theory, rooted in Vygotsky's sociocultural framework (15), provides the complementary pedagogical lens. Constructivism holds that learners actively construct knowledge through interaction with their environment, peers, and more knowledgeable others, and that learning is most meaningful when it is contextually relevant and culturally grounded (15,16). In music education, constructivist approaches emphasise active composition, collaborative performance, and the integration of students' lived cultural experiences into the learning process (17,18). This study draws on constructivism to interpret how electronic music devices serve as mediational tools that scaffold students' musical understanding particularly when anchored in Acholi musical traditions and how community musicians function as knowledgeable others who extend the pedagogical reach of classroom teachers (18).

Review of Related Literature: The integration of electronic music devices into secondary school music education has been examined across several global contexts, with findings that are broadly consistent in identifying both significant pedagogical potential and persistent implementation challenges. In Nigeria, Ayoola (1) found that music educators in Lagos secondary schools perceived information and communication technology tools as enhancing interactivity, supporting composition, and improving the clarity of musical concept presentation, though technical failures and maintenance costs regularly disrupted classroom use. Similarly, Feng (2) documented that the digital music era has transformed primary and secondary music education by enabling students to engage in composition, arrangement, and performance activities previously inaccessible without professional studio equipment. These affordances align with constructivist principles, as digital tools create conditions for active, multimodal, and student-directed musical learning (15,16).

In the Ghanaian higher education context, Arkhurst, Obeng and Yeboah (19) identified a productive tension between information and communication technology integration and cultural authenticity in colleges of education, noting that technology adoption was most successful when instructors deliberately connected digital tools to indigenous musical practices. This finding resonates with Adu-Gilmore's (18) argument for culturally sustaining music technology modules that foreground marginalised musics and enable students to engage with their own cultural heritage through digital means. The importance of cultural grounding in technology-mediated music pedagogy is further underscored by Kigozi (3), whose work on Africanising the music classroom through technology in Uganda highlights the risk of uncritical technology adoption that displaces rather than enriches local musical traditions.

Teacher preparedness emerges as a consistent theme across the literature. Asare, Twum and Amoah (21) demonstrated that colleges of education in Ghana play a pivotal role in shaping downstream classroom adoption, with graduates who received structured information and communication technology training showing significantly greater confidence and competence in integrating digital tools into music teaching. Nmadu (22) similarly found that computer application skills among music educators in Nigerian tertiary institutions were unevenly distributed, with practical pedagogical competence lagging behind theoretical awareness. Tobias (20) observed that effective music technology pedagogy requires not merely access to devices but deliberate instructional design that leverages the devices' creative affordances.

TAM-based investigations of music technology adoption have produced robust evidence that perceived usefulness and perceived ease of use are the dominant predictors of adoption intention. Bai and Zhan (14) found that digital tools amplified student motivation in music education when teachers framed them as genuinely useful for musical expression rather than as supplementary novelties. Tang, Zhou, Zhou and Rong (13) demonstrated that multimedia and blended learning approaches enhanced music elective course outcomes, with learning attitudes and teaching presence moderating the relationship between technology use and achievement. In the East African context, Kaguhangire-Barifaijo et al. (7) documented that Uganda's educational disruptions exposed deep-seated adoption complexities, including insufficient teacher training, device shortages, and institutional inertia all of which TAM would predict would suppress perceived usefulness and ease of use. Infrastructure constraints in Ugandan schools have been extensively documented.

Kakumba (23) identified limited electricity access and device shortages as primary barriers to electronic learning adoption across Uganda, a finding corroborated by Tumwesige (24), who noted that even schools with devices frequently lacked the connectivity and power supply needed to use them consistently. Beatrice (25) linked poverty and household-level economic constraints to digital education inequities in Uganda's rural secondary schools, while Ssenyonga et al. (9) found that digital technology integration in Ugandan lower secondary schools was shaped more by contextual infrastructure than by teacher willingness or curriculum design. Kibirige (10) further documented that post-pandemic information and communication technology implementation challenges for teachers in Uganda included not only technical barriers but also attitudinal resistance rooted in inadequate professional development. These structural realities are particularly acute in Northern Uganda, where post-conflict reconstruction has prioritised physical infrastructure over digital capacity (8,9).

The concept of hybrid pedagogy which integrates digital tools with traditional instructional approaches and cultural knowledge systems has gained traction as a response to these constraints. Cruywagen and Potgieter (26) argued that blended learning models in music education offer a pragmatic pathway for institutions with variable technological capacity, enabling teachers to deploy digital tools selectively and strategically rather than comprehensively. Lengoasa and Dehinbo (27) proposed prototype systems combining digital and acoustic musical engagement, demonstrating that hybrid approaches can enhance sustainable educational development even in resource-limited settings. In the Ugandan context, Busobozi and Isabirye (28) demonstrated that electronic music devices, when integrated within a competence-based pedagogical framework and supported by structured teacher preparation, can meaningfully enhance musical skill development and creative expression at the tertiary level findings that provide a proximate evidence base for the present study's secondary school focus. The role of community musicians as pedagogical partners in hybrid models is supported by Adu-Gilmore (18), who found that community-based practitioners bring cultural authenticity and contextual knowledge that enriches technology-mediated music education in ways that formal teacher training alone cannot replicate. Despite this growing body of evidence, empirical research on electronic music device integration in Ugandan lower secondary schools remains absent from the literature. The present study addresses this gap directly.

MATERIALS AND METHODS

Research Design; This study adopted a qualitative mixed-methods design, integrating semi-structured interviews, focus group discussions, and structured observation to generate a rich, contextually grounded account of electronic music device integration in lower secondary school music education (29,30). The qualitative orientation was selected because the study sought to understand meanings, perceptions, and practices phenomena that quantitative instruments alone cannot adequately capture (31). The mixed-methods component enabled triangulation across data sources, strengthening the credibility and transferability of findings (32).

Study Setting and Sampling: The study was conducted in Gulu City, Northern Uganda, between February and April 2026. Gulu City was selected because it represents a post-conflict urban setting in which the intersection of educational reconstruction, cultural revitalisation, and technological aspiration creates conditions that are both distinctive and instructive for understanding music technology integration in resource-constrained contexts (9,10). Five lower secondary schools were purposively selected to represent the diversity of the city's educational landscape: two government-aided schools, two private schools, and one community-founded school. Purposive sampling was employed throughout, guided by the criterion that participants should have direct, sustained engagement with electronic music devices in the context of lower secondary music education (29,31).

Participants: A total of 81 participants were recruited across four categories. Music teachers (n = 12, coded MT1–MT12): all twelve were actively teaching music at the Senior One to Senior Four level and had at least one year of experience using electronic music devices in their classrooms. Students (n = 60): four focus group discussions were conducted (coded FG1–FG4), each comprising fifteen students drawn from Senior One, Senior Two, Senior Three, and Senior Four respectively, with balanced gender representation. School administrators (n = 5, coded AD1–AD5): these were headteachers or deputy headteachers with direct oversight of music programme resourcing and policy. Community musicians (n = 4, coded CM1–CM4): these were Acholi traditional musicians actively engaged as informal instructional partners in at least one of the selected schools.

Data Collection: Three instruments were employed. First, a semi-structured interview guide was developed for music teachers and community musicians, comprising open-ended questions on device use, pedagogical strategies, perceived benefits and challenges, and cultural integration. Second, a structured interview schedule was used with school administrators, focusing on infrastructure, procurement, maintenance, and institutional support for music technology. Third, a focus group discussion guide was used with student groups, exploring engagement, learning experiences, and perceptions of electronic music devices. All instruments were piloted with two music teachers and one student group at a non-participating school, and refined based on pilot feedback. Interviews were conducted in English and Acholi, with the researcher serving as interpreter for Acholi-language responses. All sessions were audio-recorded with participants' consent and subsequently transcribed verbatim.

Data Analysis: Thematic analysis was conducted manually following the six-phase framework of Braun and Clarke (33,34): familiarisation with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Codes were generated inductively from participants' responses and then deductively cross-referenced against Technology Acceptance Model constructs perceived usefulness and perceived ease of use and constructivist principles of active learning, scaffolding, and cultural grounding. Analytical rigour was ensured through member checking, returning summary findings to six participants for verification, prolonged engagement with the data, and reflexive journaling throughout the analysis process (32,34).

Ethical Considerations: Institutional approval was obtained from the administration of each participating school. Written informed consent was obtained from all adult participants. For student participants, written parental or guardian consent was obtained in addition to student assent. Participants were assured of anonymity and confidentiality; all identifying information was replaced with coded designators. Participation was voluntary, and participants were informed of their right to withdraw at any time without consequence. No personal names or identifying details appear in the findings.

RESULTS

Thematic analysis of the data generated three overarching themes: (1) pedagogical affordances of electronic music devices; (2) infrastructure challenges and structural barriers; and (3) hybrid instructional models integrating digital tools and Acholi musical traditions. Each theme is presented below with supporting evidence drawn from participant responses.

Theme 1: Pedagogical Affordances of Electronic Music Devices: Electronic music devices were consistently described by teachers and students as expanding the range and depth of musical learning activities available in the classroom. The most frequently cited affordance was the capacity for composition and arrangement. Prior to the availability of digital keyboards and computers with basic audio software, composition activities were largely theoretical or limited to acoustic instruments with fixed timbres. With electronic devices, students could experiment with multiple sounds, layer rhythmic and melodic patterns, and hear immediate playback of their creative work (1,2,20).

"Before we had the keyboard, composition was something I explained on the board. Now the students actually do it. They try a melody, they change it, they hear what it sounds like. That feedback loop that is what makes the learning real." (MT3)

This observation aligns directly with constructivist principles: the device functions as a mediational tool that enables students to actively construct musical knowledge through experimentation and immediate sensory feedback (15,16). Students in FG2 corroborated this account, describing the keyboard as 'a place where you can make mistakes and fix them without anyone laughing' a formulation that reflects the psychologically safe creative space that electronic devices can afford.

A second affordance identified across all five schools was enhanced student engagement. Teachers reported marked increases in attendance and attentiveness on days when electronic devices were incorporated into lessons (13,14). MT7 noted:

"When I bring out the keyboard, even the students who normally sleep in class sit up. There is something about the sound, the lights, the buttons it draws them in. My challenge is to make sure they are learning music, not just playing with a machine." (MT7)

MT7's reflection reveals a pedagogical tension that recurred across the data: the devices' capacity to attract student attention does not automatically translate into meaningful musical learning. Several teachers described a distinction between what MT9 called 'device fascination' and genuine musical engagement a distinction that required deliberate instructional scaffolding to navigate. This finding resonates with TAM research demonstrating that perceived usefulness, not merely novelty, is the operative predictor of sustained adoption and educational benefit (11,12,14). A third affordance was the support that electronic devices provided for multimodal learning. Students with limited prior musical experience reported that visual interfaces, colour-coded keys, and audio playback functions made music theory more accessible than traditional notation-based instruction (2,20). FG4 students described using a keyboard's built-in display to understand scale patterns:

"The screen shows you which notes are in the scale. I could not read music before, but now I understand what a scale sounds like and looks like at the same time." (FG4 student)

Community musicians also identified an affordance less frequently noted by teachers: the capacity of electronic devices to bridge generational and cultural musical knowledge. CM1 observed that younger students who were initially reluctant to engage with traditional Acholi instruments showed greater willingness to explore Acholi musical concepts when introduced through the familiar interface of a digital keyboard: *"I show them the adungu pattern on the keyboard first. They understand the keyboard. Then I bring the adungu and they already know the pattern. The technology opens the door." (CM1)*

Theme 2: Infrastructure Challenges and Structural Barriers

Despite the pedagogical affordances described above, all five schools faced significant and recurring infrastructure challenges that constrained the effective integration of electronic music devices. The most pervasive was the unreliability of the electricity supply. Gulu City's power grid, while more stable than in many rural Ugandan settings, remains subject to frequent outages and voltage fluctuations that damage sensitive electronic equipment (23,24). Three of the five schools reported that at least one keyboard or computer had been rendered non-functional by power surges within the preceding academic year. AD2 described the cumulative impact:

"We bought three keyboards in 2023. One was destroyed by a power surge in 2024. We have no budget to replace it. So now two teachers share two keyboards for four classes. "It is not working." (AD2)

The financial dimension of infrastructure challenges was a consistent secondary theme. Electronic music devices represent a significant capital investment for schools operating on constrained budgets, and the costs of maintenance, repair, and replacement are rarely factored into initial procurement decisions (7,25). MT1 noted that the school's sole functional computer with audio software had not been serviced in two years because the school could not afford the technician's fee. AD4 described a broader institutional pattern:

"The government gives us a capitation grant, but it does not cover technology maintenance. We bought the devices with a one-time donation from a community group. When they break, there is no one to fix them." (AD4)

Limited internet connectivity compounded these challenges. While several schools had wireless access points, connection speeds were insufficient to support streaming-based music resources, and data costs made regular internet use prohibitive (23,24). This limitation was particularly significant for teachers who wished to use online music libraries, tutorial videos, or cloud-based Digital Audio Workstation platforms. MT5 reflected:

"I know there are free resources online that would transform my teaching. But I cannot use them here. The internet is too slow and too expensive. I am teaching with the devices in isolation no updates, no new content." (MT5)

Students in FG1 echoed this constraint, noting that the gap between what they could access on personal smartphones at home and what was available at school created a frustrating discontinuity. This observation resonates with Beatrice's (25) finding that household-level digital access can paradoxically heighten awareness of institutional resource deficits, generating disengagement rather than motivation. A further structural barrier was the absence of dedicated technical support and teacher training. None of the five schools had a staff member with specific responsibility for maintaining electronic music equipment, and none had offered in-service training on electronic music device pedagogy in the preceding three years (7,10). MT11 described the resulting situation with candour:

"I learned to use the keyboard by myself, by trial and error. I know maybe thirty percent of what it can do. The other seventy percent I have no idea. And there is no one to teach me." (MT11)

This finding is consistent with the broader literature on information and communication technology integration in Ugandan schools, which consistently identifies teacher training gaps as a primary constraint on effective technology use (7,10,22). From a TAM perspective, limited pedagogical training directly suppresses perceived ease of use: when teachers find devices difficult to operate confidently, their adoption intentions and actual use diminish accordingly (11,12).

Theme 3: Hybrid Instructional Models Integrating Digital Tools and Acholi Musical Traditions: The most generative finding of the study was the emergence, across multiple schools, of hybrid instructional models that deliberately integrated electronic music devices with traditional Acholi musical knowledge. These models were not the product of formal curriculum design or institutional policy; they had been developed organically by individual teachers and community musicians in response to the dual imperatives of technological engagement and cultural relevance (18,26,28).

The most fully developed hybrid model was observed at one government-aided school, where MT12 and CM3 had been collaborating for two academic years. Their approach involved a structured sequence in which Acholi musical concepts including the pentatonic scales characteristic of adungu music and the interlocking rhythmic patterns of larakaraka dance were first introduced through oral and kinaesthetic methods by CM3, and then reinforced and extended using the school's digital keyboard and a basic loop station by MT12. MT12 described the rationale:

"The community musician brings the culture. I bring the technology. Together we give the students both. They learn that Acholi music is not old-fashioned it is the foundation of everything we do with the machines." (MT12)

CM3 elaborated on the pedagogical logic of this sequencing:
"If I start with the adungu, some children feel it is for old people. But if the teacher starts with the keyboard and they hear the same pattern in a modern sound, then when I bring the adungu they are curious. They want to know where the pattern comes from." (CM3)

This approach exemplifies what constructivist theorists describe as scaffolded learning within the zone of proximal development (15,16): the familiar digital interface serves as a scaffold that enables students to access and engage with musical knowledge that might otherwise feel culturally distant or inaccessible. The community musician functions as the more knowledgeable other who extends that engagement into deeper cultural understanding. AD5 observed that the hybrid model had produced measurable changes in student engagement with both digital and traditional music:

"Since they started working together the teacher and the community musician the music class has the best attendance in the school. Students who never touched an instrument before are now asking to learn the adungu. I did not expect that." (AD5)

A second hybrid model, observed at two private schools, involved the use of mobile phones as accessible digital instruments. Given the schools' limited access to keyboards and computers, MT9 and MT1 had developed lesson sequences in which students used free music applications on personal smartphones to compose short melodic phrases, which were then performed and critiqued collectively. This model effectively transformed a personal consumer device into a pedagogical tool, democratising access to electronic music-making in a context where institutional device provision was insufficient (26,27). CM4 noted that this approach also enabled students to record and share traditional Acholi songs, creating digital archives of community musical knowledge:
"The students record the songs on their phones. They share them with each other. Suddenly the old songs are on the internet, on social media. The young people are proud of them. That is something I never imagined." (CM4)

DISCUSSION

The findings of this study illuminate three interlocking dynamics that define the current state of electronic music device integration in lower secondary schools in Gulu City. First, the devices demonstrably expand pedagogical possibilities supporting composition, enhancing engagement, and facilitating multimodal learning in ways that align with both TAM predictions and constructivist principles. Second, structural infrastructure deficits systematically constrain the realisation of these possibilities, creating a persistent gap between potential and practice. Third, and most significantly, teachers and community musicians are constructing hybrid models that navigate this gap creatively, producing pedagogical approaches that are simultaneously technologically innovative and culturally grounded. The pedagogical affordances identified in this study are consistent

with findings from comparable contexts. Ayoola's (1) documentation of enhanced interactivity and compositional support in Nigerian secondary schools, Feng's (2) analysis of digital music era transformations in primary and secondary education, and Tobias's (20) account of student creativity in electronic music courses all converge on the finding that electronic devices expand the range of musically meaningful activities available to students. The present study adds to this evidence base by demonstrating that these affordances are accessible even in resource-constrained post-conflict settings, provided that teachers possess sufficient pedagogical competence to leverage them intentionally. MT7's distinction between 'device fascination' and genuine musical engagement is a particularly important contribution: it suggests that the pedagogical value of electronic devices is not inherent in the devices themselves but is produced through deliberate instructional design a finding that has direct implications for teacher training programmes (21,22). The infrastructure challenges documented in this study are consistent with, and in some respects more acute than, those reported in the broader Ugandan information and communication technology literature. Kakumba's (23) identification of electricity access as a primary barrier to electronic learning, Tumwesige's (24) analysis of educational disruptions, and Kibirige's (10) documentation of post-pandemic information and communication technology implementation challenges all point to the same structural reality: Ugandan schools are expected to deploy digital technologies in conditions that make sustained, reliable use extremely difficult. The present study extends this literature by demonstrating that these challenges are not merely technical but financial and institutional: the absence of maintenance budgets, the lack of technical support staff, and the invisibility of music technology in professional development programmes collectively produce a situation in which even well-intentioned adoption is structurally undermined. This finding aligns with TAM's prediction that perceived ease of use which depends heavily on reliable, well-maintained equipment and adequate training is a critical determinant of sustained adoption (11,12,13).

The hybrid instructional models documented in Theme 3 represent the study's most original contribution to the literature. While hybrid and blended learning approaches have been theorised and documented in higher education contexts (26,27), their emergence as organic, teacher-driven responses to resource constraints and cultural imperatives in lower secondary schools in a post-conflict African city has not previously been described. The collaboration between MT12 and CM3 exemplifies a form of pedagogical partnership that simultaneously addresses the limitations of individual teacher competence, the cultural risks of uncritical technology adoption, and the motivational challenges of engaging adolescent learners with both digital tools and traditional musical heritage. This model resonates with Adu-Gilmore's (18) argument for culturally sustaining music technology modules and with Busobozi and Ekadu's (35) documentation of indigenous knowledge transmission through ensemble interdependence in Ugandan musical traditions suggesting that the principles of culturally responsive pedagogy theorised in relation to traditional instruments are equally applicable to the integration of electronic devices. CM4's observation that students are using mobile phones to record and share traditional Acholi songs on social media points to an unexpected and potentially transformative function of electronic music devices: not merely as pedagogical tools but as instruments of cultural documentation and revitalisation (18,35). This finding extends the existing literature on music technology and cultural sustainability by demonstrating that the intersection of digital accessibility and community musical knowledge can produce outcomes that neither formal curriculum design nor community cultural practice could achieve independently. Busobozi and Isabirye (28) similarly observed at the tertiary level that electronic music devices, when embedded in culturally responsive frameworks, generate learning outcomes that transcend technical skill acquisition and contribute to students' cultural identity and engagement a finding that the present study confirms in the lower secondary context.

CONCLUSION

This study has demonstrated that electronic music devices hold genuine and realisable promise for transforming lower secondary music education in Gulu City, Uganda. The devices expand compositional possibilities, enhance student engagement, and support multimodal learning in ways that are consistent with both TAM predictions and constructivist pedagogical principles. Their potential, however, is systematically constrained by infrastructure deficits unreliable electricity, inadequate maintenance, limited connectivity and by the absence of structured teacher training in electronic music pedagogy. The most significant finding is the emergence of hybrid instructional models in which music teachers and Acholi community musicians are collaborating to integrate digital tools with traditional musical knowledge, producing pedagogical approaches that are simultaneously innovative and culturally grounded. These models represent a form of grassroots pedagogical innovation that deserves recognition, documentation, and institutional support.

Three recommendations emerge from the findings. First, the government and development partners should invest in solar power infrastructure and voltage stabilisation systems for school music rooms, addressing the electricity reliability barrier that is the single most consistent constraint on effective device use. Second, the Uganda National Curriculum Development Centre should develop structured in-service training programmes on electronic music device pedagogy, designed specifically for lower secondary music teachers and incorporating culturally sustaining approaches that connect digital tools to indigenous musical traditions (4,18). Third, school administrations should formalise partnerships with community musicians as pedagogical co-facilitators, recognising their role not merely as cultural resources but as active contributors to technology-mediated musical learning (18,28,35). Future research should examine the long-term impact of such models on student musical competencies and cultural engagement, and should explore the scalability of community musician partnerships as a structural feature of music teacher professional development across Uganda and the broader region.

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