

A systematic review of digital technology-enhanced strategies in music education: Implications for South African higher education learning

*Sakhiseni Joseph Yende

Department of Language Education, Arts & Culture, University of South Africa, South Africa

*Correspondence

Email: yendesj@unisa.ac.za

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Abstract

This article contributes to scholarship on music education and digital pedagogy by providing a systematic synthesis of digital and technology-enhanced teaching strategies in higher education music learning, with a specific focus on the South African context. While existing studies have explored the benefits and limitations of digital learning, this review offers new insights by consolidating fragmented research on technology-mediated music pedagogy and examining how these approaches function within the socio-economic and educational realities of South African universities. By applying PRISMA-guided systematic review methods to literature published between 2015 and 2025, the study identifies emerging pedagogical patterns and highlights the ways in which digital tools reshape both theoretical instruction and practical musicianship in tertiary music education. The originality of this study lies in its contextual emphasis on digital inequality and culturally responsive pedagogy in music education. The review demonstrates how digital platforms such as virtual rehearsal environments, collaborative online spaces, and digital archiving tools can support multilingual engagement and the preservation and dissemination of indigenous musical knowledge. In doing so, the study extends current debates in digital pedagogy by foregrounding the role of technology in sustaining culturally relevant music education practices. Furthermore, the article advances scholarship by linking technological innovation in music education to broader structural challenges in South African higher education. It highlights how disparities in digital infrastructure, institutional resources, and digital literacy shape the implementation of technology-enhanced learning. These findings inform curriculum reform and national policy debates on equitable digital transformation in South African higher education music programmes nationwide.

Keywords: Culturally responsive pedagogy; digital music education; higher education; inclusive digital pedagogies; technology-enhanced learning

INTRODUCTION

It is prudent to foreground this study with a brief overview of South Africa's higher education landscape to contextualise digital, technology-enhanced strategies in music education within the institutions under review. South Africa's higher education system is



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characterised by significant diversity, encompassing traditional universities, universities of technology, and comprehensive institutions that serve a wide range of socio-economic, linguistic, and cultural communities ([Achieng & Mlitwa, 2024](#); [Mzangwa, 2019](#)). Since the democratic transition in 1994, the sector has undergone substantial transformation aimed at widening access, redressing historical inequalities, and promoting social justice ([Mosala et al., 2017](#)). For instance, [Wildschut et al. \(2018\)](#) highlight that policies such as the White Paper on Post-School Education and Training, alongside the expansion of financial aid through the National Student Financial Aid Scheme (NSFAS), have significantly increased participation among historically marginalised groups. This perspective is reinforced by [Phatlane et al. \(2025, p. 2\)](#), who note:

After 1994, the South African government increased higher education funding, with the aim to enhance its accessibility to deserving students, by utilising the National Student Financial Aid Scheme (NSFAS). This NSFAS funding was intentionally utilised to fund indigent higher education students from the less fortunate social classes, with the hope to achieve social justice and poverty alleviation to the targeted young people. The overall aim was to possibly increase their employability in the labour market.

Drawing from this insight, it is evident that since the dawn of democracy there has been considerable progress in addressing issues that historically affected marginalised communities, particularly in higher education. A key dimension of this transformation is the integration of digital technologies into teaching, learning, and assessment across disciplines. [Kilfoil \(2015, p. 5\)](#) corroborates this shift, noting:

There has been a clear shift in South African higher education from relatively low/poor ICT infrastructure, where institutions were solely responsible for both infrastructure and education provision, to a more cloud-based ICT infrastructure with 'unlimited' educational possibilities, and a higher reliance on low-cost, mobile, flexible, ubiquitous technology solutions that are often initiated and provided by academics and students.

The adoption of digital technologies in higher education has not only expanded access to learning resources but has also transformed teaching and learning practices, enabling more flexible, interactive, and collaborative experiences ([Haleem, et. al., 2022](#)). In the context of music education, several scholars such as ([Pashchenko, et.al., 2025](#); [Yende and Madolo, 2023](#); [Yihan, et.al., 2025](#)) agree that these developments create opportunities for innovative pedagogical strategies, including online performance platforms, digital tools for composition and notation, and virtual collaboration, which enhance both theoretical knowledge and practical skills. Situating these strategies within the South African higher education context is critical, as they operate within a system shaped by historical inequalities, ongoing transformation, and evolving technological infrastructures.

Despite significant advances, South Africa's higher education sector continues to face structural challenges, particularly in rural and under-resourced institutions. Disparities in resources, uneven technological infrastructure, and persistent digital divides affect both students and educators ([D'Alessio, et al., 2019](#); [Yende, 2021](#)). These inequities were especially visible during the COVID-19 pandemic, when emergency remote teaching exposed gaps in internet connectivity, device availability, and digital literacy. In music education, these challenges are amplified by the discipline's resource-intensive nature, which requires specialised equipment, rehearsal spaces, and performance opportunities ([Yende & Madolo, 2023](#)). Addressing these constraints is essential to ensure that digital and technology-enhanced strategies can be implemented effectively and equitably across South African higher education institutions.

Technology-mediated approaches in music education including learning management systems, virtual performance platforms, digital audio workstations, and online collaboration tools have expanded instructional possibilities beyond traditional studio and ensemble settings (Dudley, 2022; Mandanici, et.al., 2023). Yao (2025, p. 71) writes that:

The integration of technology into music education has significantly transformed the learning experience, particularly for beginner piano students. Technologies such as visual feedback systems and tactile measurement tools provide objective insights into performance, enabling learners to self-assess and improve technical accuracy. Digital platforms support flexible learning environments, allowing personalised practice schedules and fostering interactive engagement through online forums and multimedia resources. Blended learning models further enhance pedagogical effectiveness by combining traditional instruction with digital tools, promoting transparency and traceability in progress.

It is evident that these innovations support flexible, blended, and fully online learning environments that accommodate diverse student needs, foster creativity, and enhance engagement. In the South African context, digital music education holds particular importance, as it can broaden access, promote multilingual and multicultural learning, and preserve indigenous musical traditions through digital archiving and dissemination (Moses, 2021; Yende & Madolo, 2023). However, the success of these strategies depends on equitable access to infrastructure, adequate digital literacy, and contextually relevant pedagogical approaches. By addressing these structural and technological challenges, higher education institutions can leverage digital innovations to transform music education, creating inclusive, interactive, and culturally responsive learning environments that benefit all students.

While existing scholarship affirms the pedagogical value of digital technologies in music education (Dudley, 2022; Mandanici, et.al., 2023), several gaps remain. Much of the literature is concentrated in Global North contexts, limiting the applicability of findings to developing regions with infrastructural constraints (Dudley, 2022; Guo et al., 2024). In South Africa, research is fragmented and often confined to case studies within single institutions or programmes, offering limited generalisability (Moses, 2021; Yende & Mdolo, 2023). Furthermore, there is insufficient exploration of how digital music education can address systemic inequalities, support multilingualism, and sustain indigenous musical heritage. The intersection of digital pedagogy, social justice, and culturally responsive music education remains under-theorised.

This article is motivated by the need to synthesise and critically evaluate digital and technology-enhanced strategies in music education, with particular attention to their implications for South African higher education. By conducting a systematic review, the study seeks to identify effective practices, highlight contextual challenges, and generate broadly applicable insights for technology-mediated learning. The review aims to inform curriculum design, policy development, and professional training, ensuring that digital music education contributes to equitable, inclusive, and culturally relevant higher education systems. Therefore, the following four research questions were developed to provide a clear understanding of digital, technology-enhanced strategies in music education and their implications for higher education learning in South Africa:

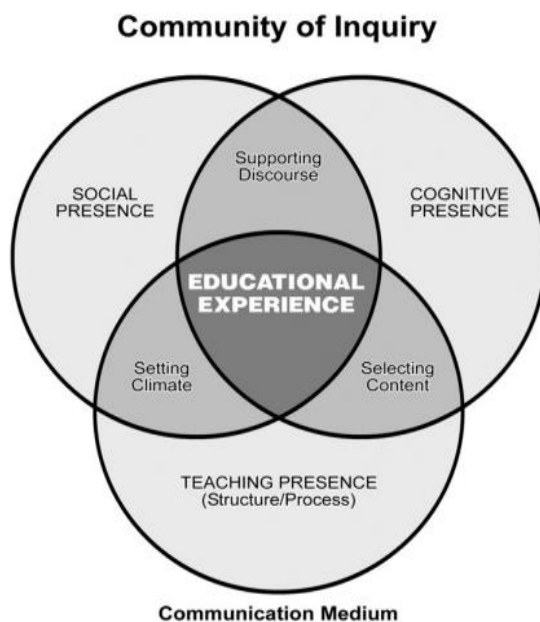
1. How are digital technologies transforming music education in South African universities?
2. What benefits do technology-enhanced strategies offer music students' learning experiences?
3. Which barriers hinder effective digital music education implementation in higher education?
4. How can digital pedagogy promote inclusive, culturally responsive music education practices?

Theoretical framework

The Community of Inquiry (CoI) framework (Garrison et al., 2000; Garrison et al., 2010) provides a robust lens for examining how digital and technology-enhanced strategies shape teaching and learning in higher education music programmes. The framework posits that meaningful learning emerges through the interaction of three interdependent elements: cognitive presence, social presence, and teaching presence. Cognitive presence refers to students' construction and confirmation of meaning through reflection, dialogue, and critical thinking. Social presence involves authentic interaction and collaborative engagement within a learning community. Teaching presence encompasses instructional design, facilitation, and guidance that support effective learning experiences.

Figure 1

Community of Inquiry Framework (adapted from Garrison et al., 2000, p. 89).



In this study, the CoI framework guided the analysis of 31 systematically selected studies, providing a structured approach for thematic coding. During the analytical process, open coding was applied to extract findings related to digital pedagogy, tools, student experiences, and culturally responsive practices. Axial coding then grouped similar codes into broader categories, which were refined into analytical themes. These themes were not predetermined by the research questions but emerged from cross-study synthesis, enabling the identification of patterns, contradictions, and contextual insights. The final themes were then mapped onto the research questions for coherent presentation.

Cognitive Presence is reflected in the theme “Benefits of Technology-Enhanced Music Education.” The 31 studies demonstrate that digital tools, such as music notation software, recorded rehearsals, discussion forums, and reflective journals, enable students to analyse performances, integrate theory with practice, and engage in self-directed learning (Carroll et al., 2025; Safari, 2024; Schmidt-Jones, 2015; Mzangwa, 2019). This interaction fosters analytical thinking, creativity, and reflective musicianship, illustrating how cognitive presence is enacted in technology-mediated music learning.

Social Presence aligns with the theme “Inclusive and Culturally Responsive Digital Pedagogy.” Findings show that virtual rehearsal platforms, collaborative composition software, and online peer feedback spaces support ensemble collaboration, authentic interaction, and the expression of cultural identity (Enbuska et al., 2018; Wildschut et al., 2018; Mosala et al., 2017). These tools facilitate student engagement in multicultural and multilingual contexts, preserving indigenous musical knowledge while fostering a sense of community, trust, and mutual support essential for artistic development.

Teaching Presence is evident in the theme “Transformation of Teaching and Learning Practices through Digital Technologies.” The studies indicate that lecturers’ careful design of online lessons, multimedia demonstrations, and facilitation of interactive activities ensures that technology supports rather than replaces pedagogy (Yende & Madolo, 2023; Kilfoil, 2015; Mercado, 2022). Learning management systems, video-based tutorials, and digital feedback mechanisms scaffold student learning, demonstrating how teaching presence mediates both cognitive and social dimensions in digitally enhanced music education.

The theme “Barriers to Effective Implementation” intersects with all three CoI elements. Limited digital infrastructure, unequal internet access, and varying digital literacy affect lecturers’ ability to provide structured learning (teaching presence), constrain students’ engagement and reflective practice (cognitive presence), and limit collaborative participation (social presence) (Yende, 2021; Phatlane et al., 2025). By integrating these barriers into the analysis, the CoI framework highlights the structural and contextual conditions necessary for meaningful learning.

The synthesis also applied comparative analysis across studies, grouping evidence by pedagogical approaches, digital tools, and cultural context. Contradictions, such as differing levels of engagement in rural versus urban institutions, were critically examined, ensuring that the review moves beyond narrative summarisation to a systematic analytical contribution. By mapping findings to CoI dimensions, the study demonstrates how digital music education practices support deep learning, community building, and instructional effectiveness while revealing persistent structural inequalities.

In conclusion, the CoI framework provides a holistic lens for interpreting technology-mediated music education. This study demonstrates how digital tools enact cognitive, social, and teaching presence, thereby promoting meaningful, inclusive, and culturally responsive learning in South African higher education. By explicitly linking analytical themes to CoI dimensions, the review offers both theoretical and practical insights, informing curriculum design, digital pedagogy, and policy interventions to strengthen equitable access and engagement in tertiary music education.

METHODS

Study design

This study employed a systematic review design to examine digital technology-enhanced strategies in music education and their implications for higher education learning in South Africa. Systematic reviews are a type of evidence synthesis in which authors develop explicit eligibility criteria, collect all available studies that meet these criteria, and summarise results using reproducible methods to minimise bias ([Brignardello-Petersen et al., 2025](#); [Martinez et al., 2025](#)). Unlike narrative or scoping reviews, systematic reviews provide a rigorous, transparent, and reproducible approach to synthesising evidence, enabling patterns, best practices, and gaps in the literature to be identified clearly ([Mannarath, 2025](#); [Brignardello-Petersen et al., 2025](#)).

A systematic review was deemed appropriate for this study because digital music education involves diverse tools, pedagogies, and institutional contexts, making it essential to synthesise evidence systematically to identify effective practices and contextual challenges within South African higher education. The review included peer-reviewed journal articles, conference proceedings, dissertations, book chapters, and policy reports relevant to technology-mediated music education.

Search strategy

A systematic search was conducted between March and July 2025 using advanced search functions in multiple academic databases, including ProQuest, EBSCOhost, LearnTechLib, JSTOR, ERIC, Google Scholar, and institutional thesis repositories. The search aimed to identify literature on digital and technology-enhanced music education in higher education, with a focus on South African contexts while including international studies with transferable insights.

Boolean search strings were used to combine relevant keywords across multiple categories, including music education, digital technology, pedagogical approaches, and inclusive/culturally responsive teaching. The primary search string was: (“music education”) AND (“digital technology” OR “technology-enhanced learning” OR “online music teaching” OR “blended learning” OR “virtual performance” OR “digital pedagogy”) AND (“South Africa”) Additional search strings were tailored to specific aspects of the study: pedagogy-focused, technology-focused, and cultural/inclusion-focused searches. These search strings ensured a comprehensive capture of studies relevant to teaching strategies, digital tools, and culturally responsive practices in music education.

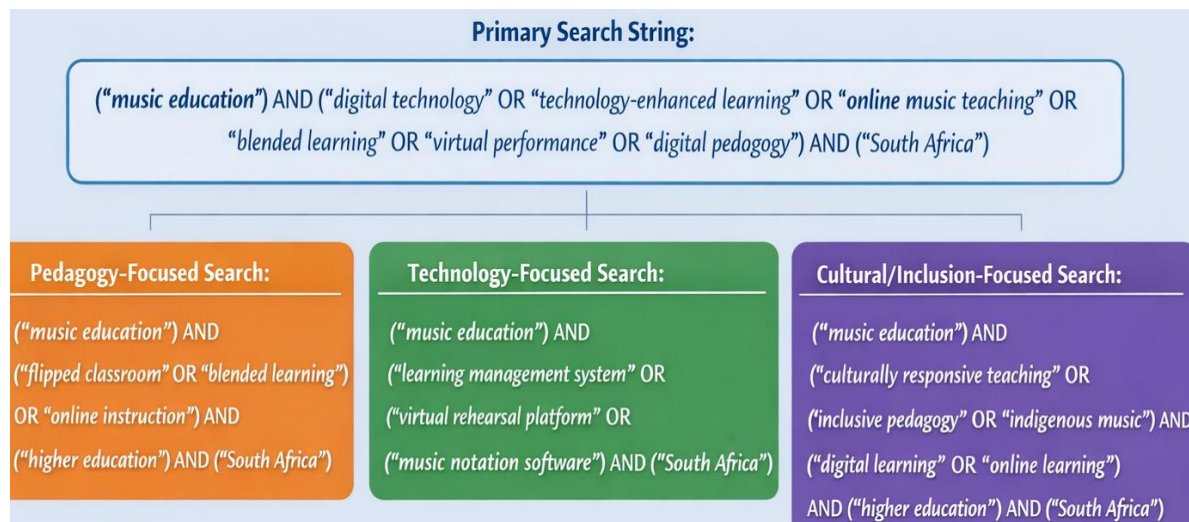
The screening process involved duplicate removal, title and abstract screening, and full-text review against predefined inclusion and exclusion criteria (see Methods section). Discrepancies were resolved through discussion between two independent reviewers. Figure 2 illustrates the Boolean search strings and exact search strategy, highlighting databases searched, keyword categories, search limits, and the screening workflow.

Search limits:

- Language: English
 - Publication years: 2010–2025 (except CoI foundational studies, 2000–2010)
 - Document types: peer-reviewed journal articles, conference proceedings, dissertations, book chapters, and policy reports
-

Figure 2

Boolean Search Strings



Inclusion and exclusion criteria

Titles and abstracts were screened to determine relevance. Studies were included if they:

- Focused on music education in higher education contexts.
- Examined digital or technology-enhanced teaching and learning strategies.
- Provided empirical findings or theoretically grounded insights applicable to South Africa.

Studies were excluded if they:

- Focused solely on primary or secondary education.
- Addressed music technology without pedagogical relevance.
- Lacked clear implications for higher education learning.

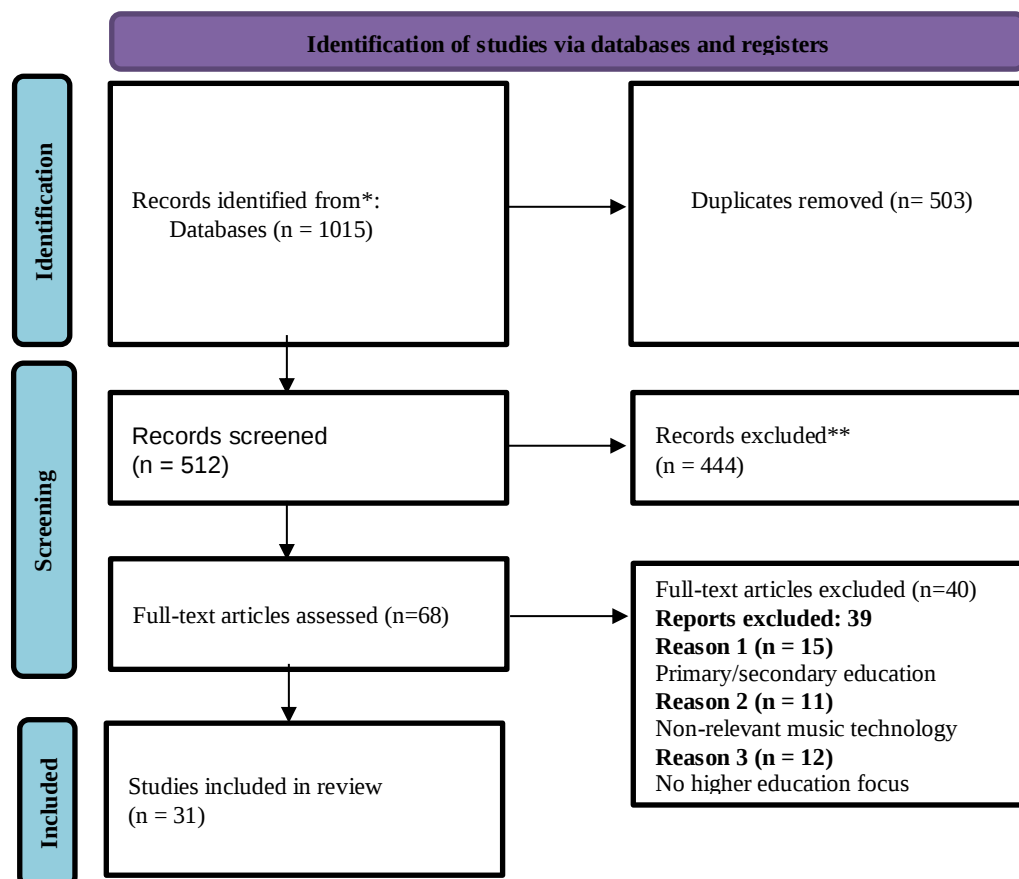
Following screening, 68 full-text articles were reviewed, with 31 meeting the inclusion criteria. An additional three studies were identified through manual reference searches.

PRISMA flow diagram

The systematic search initially identified 1,015 records across all databases. After removing 503 duplicates, 512 unique records remained for title and abstract screening. Screening these records against the predefined inclusion and exclusion criteria resulted in 68 full-text articles for detailed review. Of these, 28 articles met the inclusion criteria. An additional 3 studies were identified through manual reference checks, bringing the total number of studies included in the final synthesis to 31. All screening steps followed the PRISMA 2020 guidelines (Rethlefsen & Page, 2022) to ensure transparency, reproducibility, and methodological rigor. Two independent reviewers conducted title, abstract, and full-text screening, resolving any discrepancies through discussion to minimise bias.

Figure 3

PRISMA Flow Diagram of Database Search and Article Screening (Rethlefsen & Page, 2022)



Screening and coding

Screening was conducted independently by two reviewers to reduce bias and ensure reliability. Discrepancies were resolved through discussion. Selected full-text articles were coded using a thematic analysis approach. Coding categories were guided by the Community of Inquiry framework, mapping findings to cognitive presence, social presence, and teaching presence. Themes were grouped by pedagogical approach (e.g., flipped classroom, virtual rehearsals), technology type (e.g., LMS, music notation software, collaborative platforms), and contextual factors (e.g., urban vs rural universities, resource availability).

Data synthesis and analysis

Data were organised in Microsoft Excel to identify trends, patterns, and recurring themes. The qualitative evidence was synthesised using a storytelling approach, which enabled a coherent narrative while critically comparing and contrasting findings across studies. For instance, studies demonstrating high cognitive engagement through reflective journals and online discussion forums were contrasted with research reporting low engagement due to digital literacy limitations. Social and teaching presence themes were similarly evaluated across different institutional and technological contexts, highlighting both successful strategies and persistent challenges.

Triangulation

To enhance credibility and analytical depth, methodological triangulation was applied by integrating findings from empirical studies, theoretical literature, and policy documents. This triangulation enabled a comprehensive understanding of digital music education practices and their implications for equitable, inclusive, and culturally responsive learning in South African higher education.

Ethical consideration

The study relied exclusively on secondary data, so formal ethical clearance was not required. Nevertheless, ethical principles were observed through accurate reporting, proper citation, and transparent methodology. No human or animal subjects were involved.

RESULTS AND DISCUSSION

Results

Major themes synthesis

The systematic review of digital technology-enhanced strategies in music education revealed following four major themes that address the research questions guiding this study (See table below). These themes highlight how digital tools and pedagogical innovations are transforming music education in South African higher education, the benefits they provide to students, the barriers hindering effective implementation, and the potential for inclusive and culturally responsive digital pedagogy.

Table 1

Research questions and themes emerged

Research questions	Themes emerged from the research questions
How are digital technologies transforming music education in South African universities?	Transformation of Teaching and Learning Practices through Digital Technologies: Digital tools and online platforms enhance teaching methods, enable virtual rehearsals, and foster flexible, collaborative learning in South African universities (Yende & Madolo, 2023; Kilfoil, 2015).
What benefits do technology-enhanced strategies offer music students' learning experiences?	Benefits of Technology-Enhanced Music Education: Technology-mediated strategies improve student engagement, creativity, and self-directed learning while supporting performance skills and theoretical understanding in music education (Achieng & Mlitwa, 2024; Mzangwa, 2019).
Which barriers hinder effective digital music education implementation in higher education?	Barriers to Effective Implementation: Challenges include unequal access to infrastructure, limited digital literacy, and resource constraints, especially in rural or underfunded higher education institutions (Yende, 2021; Phatlane et al., 2025).
How can digital pedagogy promote inclusive, culturally responsive music education practices?	Inclusive and Culturally Responsive Digital Pedagogy: Digital pedagogy supports multilingualism, indigenous music preservation, and culturally sensitive teaching, promoting equitable and socially relevant music education practices (Mosala et al., 2017; Wildschut et al., 2018).

Clarification of theme generation and analytical process

The themes presented in Table 1 were not predetermined by the research questions. Instead, they emerged from a systematic coding and thematic synthesis of the 31 included studies. The process followed these steps:

1. Open Coding: Each study was read thoroughly, and all relevant findings regarding digital technologies, pedagogy, student learning, and cultural responsiveness were coded in Microsoft Excel.

2. Axial Coding: Similar codes were grouped into broader categories reflecting recurring patterns across multiple studies. For example, codes related to virtual rehearsals, online discussions, and multimedia integration were grouped under the theme of transformation of teaching and learning practices.
3. Theme Refinement: The categories were then refined into analytical themes that capture cross-study synthesis rather than merely summarising individual studies. This step involved comparing, contrasting, and reconciling findings, including contradictory evidence, to produce themes that represent collective insights from the literature.
4. Alignment with Research Questions: Finally, themes were mapped onto the research questions to provide coherence in presentation while maintaining the integrity of the data-driven synthesis.

This approach ensured that Table 1 reflects systematic analysis and critical synthesis of the literature rather than simple categorisation, strengthening the manuscript's analytical rigour.

Theme 1: Transformation of music education through digital technologies

Digital technologies are reshaping music education in South African higher education, providing innovative avenues for teaching, learning, and collaboration. This view was supported by [Yende \(2023, p. 2\)](#) who mentions that:

In recent years, the landscape of higher education has undergone a paradigmatic shift driven by the rapid advancement of digital technologies. South Africa, a nation with a rich tapestry of cultural diversity, is no exception to this transformative wave. Within this dynamic context, the domain of music education has been significantly impacted by the proliferation of distance learning modalities.

It is evident that online learning platforms, virtual performance spaces, digital audio workstations, and music notation software have expanded instructional possibilities beyond traditional studio or ensemble settings ([Kilfoil, 2015](#); [Yende & Madolo, 2022](#)). These tools enable educators to design flexible, blended, or fully online courses, accommodating diverse learning preferences and schedules. Virtual rehearsals and collaborative online projects allow students to interact with peers and instructors in real time, irrespective of geographical barriers, promoting engagement and teamwork ([Achieng & Mlitwa, 2024](#); [Nyamwaka, 2025](#)).

Furthermore, digital technologies facilitate access to a wide range of musical resources, including recordings, scores, and interactive learning modules, enriching students' theoretical and practical understanding. The COVID-19 pandemic accelerated the adoption of these technologies, highlighting their potential to maintain continuity in music education despite disruptions ([Phatlane et al., 2025](#)). For instance, [Moses \(2021, p. 343\)](#) writes that:

Traditional music lesson teaching and learning models were adversely impacted because the face-to-face teaching approach could no longer be applied. Extension of the university semester and makeup lessons proved inadequate, as students lost momentum in their learning. An online teaching and learning tool was designed in response to the programme delivery, learning styles, and assessment methods. A flexible and relevant online music programme was designed, addressing the distinct challenges of this student profile. Student learning preferences, teaching techniques, assessment methods, online platform preferences, infrastructural availability, and challenges were considered.

It is evident that the integration of digital tools also enables educators to experiment with innovative pedagogical approaches, such as flipped classrooms, multimedia

assessments, and adaptive learning modules tailored to student progress. Despite the evident transformation, the effectiveness of digital integration depends on institutional support, technological infrastructure, and educators' digital literacy (Yende and Madolo, 2023). Nevertheless, these innovations mark a significant shift in South African higher education, providing opportunities to modernise music curricula, enhance learning experiences, and prepare students for increasingly digital professional environments. By understanding how digital technologies are transforming music education, institutions can develop strategies to optimise these tools, ensuring that they are pedagogically meaningful and contextually relevant.

Theme 2: Benefits of technology-enhanced learning experiences

Technology-enhanced learning strategies in music education offer numerous benefits that improve student engagement, creativity, and academic performance. Digital tools enable students to interact with content dynamically, access multimedia resources, and practice skills at their own pace, supporting self-directed and active learning (Mzangwa, 2019; Kilfoil, 2015). Virtual rehearsal platforms, interactive music software, and online tutorials allow students to refine both theoretical understanding and practical musicianship outside conventional classroom settings, fostering autonomy and reflective learning (Yende & Madolo, 2023).

Students also experience increased collaboration through online group projects and peer feedback systems, which strengthen social presence and communication skills (Achieng & Mlitwa, 2024; Nyamwaka, 2025). The integration of technology supports differentiated learning, accommodating diverse abilities, backgrounds, and learning styles. Additionally, digital assessment tools provide timely feedback, enabling students to monitor their progress and identify areas for improvement.

In South Africa, technology-enhanced learning has particular significance, as it can bridge gaps in access to quality resources, especially for students in under-resourced institutions (Phatlane et al., 2025). Online platforms provide exposure to international music trends, performances, and pedagogical practices, broadening students' perspectives and professional readiness. These benefits collectively contribute to higher student motivation, engagement, and satisfaction, which are critical for learning outcomes in music education. By leveraging technology strategically, educators can enrich the learning experience, enhance performance skills, and promote lifelong engagement with music.

Theme 3: Barriers to effective implementation

Despite the potential of digital music education, several barriers hinder its effective implementation in South African higher education. Structural and infrastructural challenges remain significant, particularly in rural and under-resourced institutions (Yende & Madolo, 2023). Disparities in access to reliable internet, digital devices, and appropriate software limit opportunities for equitable participation. Additionally, digital literacy among both educators and students is a critical factor, as many instructors lack sufficient training to design, deliver, and assess technology-mediated learning effectively (Kilfoil, 2015).

Music education poses further challenges due to its inherently resource-intensive nature. Yende and Madolo (2023, p. 348) note that many universities, especially those in rural areas:

... lack of facilities such as proper music studios has exacerbated the challenges music schools face in rural-based institutions in South Africa. The issues of inequality, insufficient facilities, and poor infrastructure in rural-based institutions have become key factors for successful blended teaching and learning.

Similarly, [Moses \(2021, p. 531\)](#) observes:

Students lack access to music instruments, smartphones, laptops, and the internet. A SMART (specific, measurable, achievable, realistic, and timely) stepwise online lessons programme was designed to facilitate instrumental teaching during university closures and lockdowns. The SMART programme draws on the Industry 4.0 manufacturing model in which the knowledge is decentralised, autonomous, and self-optimising, thereby promoting a stepwise student-centred learning approach.

Practical instruction often requires specialised equipment, rehearsal spaces, and live performance opportunities, which cannot always be fully replicated online ([Netshivhambe, 2025](#); [Yende & Madolo, 2023](#)). These limitations may lead to uneven learning experiences, reducing the effectiveness of digital strategies for some students. Institutional policies and funding priorities also influence the adoption of digital tools. Without adequate support, educators may struggle to integrate technology meaningfully into curricula, resulting in fragmented or inconsistent implementation.

Socio-economic disparities among students further exacerbate access challenges, with disadvantaged learners facing difficulties in participating fully in digital learning environments ([Phatlane et al., 2025](#)). Addressing these barriers requires comprehensive strategies, including investment in infrastructure, professional development for educators, and inclusive policies to ensure equitable access. Overcoming these challenges is essential for realising the full potential of technology-enhanced music education in South Africa, creating an environment where all students can engage meaningfully, regardless of background or location.

Theme 4: Inclusive and culturally responsive digital pedagogy

Digital pedagogy offers opportunities to advance inclusive and culturally responsive practices in South African music education. By integrating technology, educators can design learning experiences that acknowledge linguistic, cultural, and socio-economic diversity while promoting equity ([Mosala et al., 2017](#)). Digital tools enable access to a wide range of musical traditions, including indigenous and regional music, facilitating preservation and dissemination of cultural heritage ([Wildschut et al., 2018](#)).

Technology-mediated platforms allow educators to implement multilingual instruction and collaborative projects, which cater to South Africa's diverse student population. Virtual learning environments can accommodate different learning styles and abilities, ensuring participation and engagement for all students. Furthermore, inclusive digital pedagogy fosters critical thinking about social and cultural contexts in music, encouraging students to reflect on identity, representation, and cultural relevance in their learning ([Achieng & Mlitwa, 2024](#)).

By leveraging these strategies, music education can move beyond Eurocentric curricula and create spaces where multiple musical traditions coexist, and all students feel represented. Digital pedagogy also supports adaptive and flexible learning, allowing educators to tailor instruction to students' needs while maintaining rigorous learning outcomes. Implementing inclusive and culturally responsive approaches ensures that technology-enhanced music education contributes not only to academic success but also to social justice, equity, and cultural awareness in South African higher education.

Discussion

This article has argued that digital and technology-enhanced strategies are transforming music education in South African higher education. It has also highlighted that the adoption of these strategies offers both opportunities and challenges, shaping the ways in which

students engage with music learning, practice, and performance. The findings of this article mention that digital technologies, including virtual rehearsal platforms, online collaboration tools, and music software, are enabling flexible, interactive, and student-centred learning environments. Consistent with previous research (Kilfoil, 2015; Yende & Madolo, 2023), the findings of the current article reveal that these tools enhance pedagogical approaches by allowing educators to extend learning beyond physical classrooms and traditional ensemble settings. Evidently, digital integration in music education fosters creativity, autonomy, and critical thinking among students.

The article findings show that technology-enhanced learning improves access to resources and promotes engagement, aligning with studies by Achieng and Mlitwa (2024) which highlight that digital platforms can broaden participation for students from diverse socio-economic and cultural backgrounds. Scholars such as Phatlane et al. (2025) emphasise that these strategies not only support skill development but also enable students to interact with international music content, thereby expanding their musical perspectives. Again, the findings of the current article show that access to infrastructure, digital literacy, and institutional support significantly affect the effectiveness of technology-mediated strategies. This finding corroborates the results of Yende (2021), who found that inequities in resources and digital access remain a barrier to equitable implementation in South African higher education.

Using a framework of analysis largely informed by the central tenets of the Community of Inquiry (CoI) framework (Garrison, Anderson, & Archer, 2000), the study examined the interplay between cognitive, social, and teaching presence in digital music learning environments. By so doing, the article has argued and revealed that meaningful learning in technology-mediated music education depends on a balance of instructional design, student engagement, and collaborative opportunities. As highlighted earlier, digital pedagogy can foster inclusivity and culturally responsive practices when thoughtfully integrated, supporting multilingual learning, indigenous music preservation, and equitable participation.

The approach and analysis in the article were informed by what the researcher views as a nexus that gradually grew in recognising the interdependence of access, pedagogy, and technology. Cumulatively, the article has established that while digital strategies offer significant pedagogical benefits, systemic barriers such as socio-economic disparities, limited digital literacy, and infrastructural constraints must be addressed for full implementation. This finding is in congruence with the findings of previous studies (Moses, 2021; Mosala et al., 2017) that emphasise the importance of institutional support and targeted professional development for educators.

The results of this article reveal that technology-enhanced music education can transform student learning experiences, increase engagement, and support diverse pedagogical approaches. However, the potential of these strategies is contingent on equitable access, culturally responsive curricula, and comprehensive institutional planning. These insights provide practical implications for educators, policymakers, and higher education institutions seeking to leverage digital technologies to enhance music education in South Africa.

CONCLUSION

The systematic review suggests several strategies for enhancing digital and technology-mediated music education: *First*, strengthen digital infrastructure and access. Universities

should invest in reliable internet connectivity, devices, and software to ensure equitable participation, particularly for students from rural or under-resourced areas. *Second*, prioritise professional development for educators. Training should focus on designing, facilitating, and assessing technology-mediated music learning, including effective use of multimedia, virtual rehearsals, and collaborative tools. *Third*, integrate inclusive and culturally responsive pedagogies. Curricula should leverage digital platforms to preserve indigenous musical knowledge, support multilingual instruction, and promote socially relevant learning experiences. *Fourth*, align institutional policies and funding mechanisms. Sustained technology integration requires coherent policy support and financial investment in digital resources and educator development.

Digital technologies can transform music education by enhancing engagement, creativity, and learning flexibility. However, infrastructural, socio-economic, and pedagogical barriers continue to limit equitable implementation. A key insight from this study is the recognition of digital pedagogy as both a learning tool and a medium for social equity. Technology-mediated strategies foster culturally responsive, student-centred, and contextually relevant practices that address historical inequities and expand access to higher music education. Implementing these recommendations will contribute to resilient, inclusive, and innovative music learning environments across South African higher education institutions.

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