

From Print to Digital: A Comparative Study of Music Teaching Materials Access via Digital Repositories in Cross-Cultural Contexts

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Abstract

The approach as well as accessibility of music instruction across diverse cultures have been altered by the shift from print-based materials to online archives. In contrast to traditional print materials, the study emphasizes how music instructors from diverse cross-cultural orientations employ, access, or analyze digital teaching tools. The study examines how digital records support access to miscellaneous multi-cultural music contented, pedagogical variation, and instructional efficiency based on judgments conducted in organizations in various sociocultural backgrounds. The findings propose that while digital platforms inspire culturally complex education, they also growth the accessibility of music gatherings worldwide. The research study was analyzed through smart PLS software and generated descriptive results related to digital repositories. Additionally, the study discloses that teachers in scientifically advanced and resource-constrained environments have changed usage patterns, which may designate a widening generational gap. Using quantitative data, the study shows how digital documentation could increase the creative process, promote intercultural sympathetic, and alter the way music is qualified. The study concludes by repeating the need for improved digital resource design, comprehensive repository expansion, and targeted professional training in order to make

the assistance of digital admittance manageable to everyone, regardless of cultural or educational circumstantial.

Keywords: Print to Digital (P&D), Music Teaching Materials Access (MTMA), Digital Repositories (DR), Cross-Cultural Contexts (CCC)

Introduction

The field of musical education has shifted dramatically in the past few years, due to fast improvements in digital technology and the increasing number of online educational platforms. For many years, music teachers depended significantly on written resources, including scores, textbooks, instructional workbooks, and method books. These resources acted as both educational resources and cultural records, reflecting the pedagogical theories, musical traditions, and aesthetic ideals of the countries in which they were created. The manner in which music instructional resources are produced, accessed, and utilized is changing dramatically as online archives and digital repositories continue to develop. The worldwide landscape of modern music education has changed as a result of the shift from print-based to digital music teaching resources (Burchardt and Yasemin Ural, 2024). The function of digital repositories to facilitate multi-cultural environments for learning continues to increase in both practical and academic significance as they become more and more essential to how educators find, distribute, and curate educational

materials. Music pedagogy has historically depended on printed resources, including method books, scores, teacher-compiled lesson notes, and theory workbooks, to provide the foundation of teaching and learning. However, the drawbacks of print-based education, such as restricted accessibility, high production costs, slow dissemination, and limited multi-cultural portrayal, have become more apparent in a decade highlighted by swift developments in technology and the broadening of music education (Adler, 2001). Digital repositories, delivering wide-ranging data in multiple formats, aim to alleviate many of these difficulties. However, their access and efficacy differ substantially across linguistic, cultural, and socioeconomic scenarios, demanding further comparative research (Edward et al., 2019). Teachers can instantly access a variety of teaching resources, such as audio recordings, digital scores, video tutorials, culturally specific repertoires, play-along tracks, as well as interactive musical performance and composition tools, through digital repositories consisting of academic repositories, OER, online music archives, and educational multimedia hubs. This development broadens instructional opportunities by enabling teachers to use multimodal materials that mirror genuine practices for performance and promote varied learning. As an illustration, video displays can transmit minor stylistic distinctions in indigenous or traditional music that written notes are unable to do. Additionally, online libraries frequently record repertoires from many cultural sources, providing greater coverage than the typically Western-based print curricula (Fetokaki, 2023). With these developments, the use and influence of digital repositories vary greatly within different cultural contexts. Apart from this, accessibility is influenced by a variety of factors, including digital literacy, personal cultural structure, educational standards, local music traditions, and institutional regulations. Whereas teachers in highly developed technological environments may include digital repositories in their teaching routines, teachers in rural or low-resource environments may encounter bandwidth limits, limited equipment, or a shortage of educational opportunities in digital exploration and analysis. Furthermore, cultural relevance also has great importance. Libraries based on Western cataloging standards might be unable to contain or properly categorize non-Western styles, regionally significant instructional resources, or orally transmitted

traditions. This leads to digital disparities, since the wealth of worldwide resources does not always convert into culturally appropriate access for all instructors. Moreover, the transition from print-based to digital-based highlights concerns regarding the ongoing maintenance of knowledge about culture (Kharicheva et al., 2020). In particular societies, music education is firmly ingrained in the transmission through the community, mentorship-based learning, and oral pedagogy. The digitalization of such resources may result in disinformation, decentralization, or infringement of common intellectual property standards (Zhou et al., 2024). On the other hand, by recording and sharing culturally particular content, digital repositories may be necessary tools in various circumstances for protecting endangered musical heritage. Such opposing processes demonstrate why comparison across cultures is essential for understanding not just what is available, but additionally why and how accessibility differs (Spender, 1996).

Moreover, this relative perspective also applies to teaching practices. Teachers' decisions regarding where and how to include digital resources are influenced by curriculum expectations, school infrastructures, assessment methods, and cultural teaching approaches. In particular circumstances, trainers may choose digital repositories because of their effectiveness, wide repertoire selections, along student engagement benefits. Some may be resistant owing to worries about reliability, technical dependability, or a lack of conformity with established teaching approaches (Sear, 2024). Additionally, language obstacles, interface design, license terms, and metadata quality all influence whether trainers can effectively access and use digital repositories. So, examination of access via a cross-cultural perspective produces a more complex view compared to technologically enabled narratives, which imply universal worldwide advantages (Adler et al., 2008). The present research fits into this shifting environment, attempting to investigate the comparative perspectives of music professionals who use both digital and printed materials in situations that are culturally diverse. It aims to investigate the way in which digital repositories impact teaching methods, what sorts of resources are most popular in various countries, and the way teachers deal with technological, pedagogical, and cultural problems. In the field of music education, where cultural specificities, the sensation of hearing, and creative

interpretations of the process are interconnected, the availability of high-quality teaching resources is particularly significant. This study compares the obtainability, cultural illustration, technical convenience, and pedagogical significance of music teaching resources in cross-cultural circumstances in digital repositories. The study shows how digital platforms can both improve and constrain music instruction in multi-cultural and international learning environments by examining different educational environments and cultural contexts. Institutional libraries, the open educational resource (OER) collections, also that music archives, and specialized cultural databases are examples of digital repositories. where sheet music, audio files, lesson plans, historical texts, multimedia and interactive tools can be found. In the West, organizations such as IMSLP, the European, and the Library of Congress provide significant availability of scores, historical recordings, and scholarly analysis on classical music. Such resources characteristically arrive in high condition and organized due to strong digitalization policies and well-funded cultural organizations.

Overall, instructors in these places have a reliable internet connection, progressive educational technology, and institutional training that assistances in the addition of digital materials into music instruction. On the other hand, many Asian, African, and Latin American settings are contingent on combined resources, which include local public libraries, community-created satisfied, and government-funded online education platforms. These archives can focus on indigenous music, oral history, folk performances, and other modern local music that is not represented in Western databases proportionally. Access can, however, be limited due to the limited digitization capacity, reduced bandwidth capacity and inconsistent metadata standards. Nevertheless, culturally rich repositories, such as the African Music Archive, the Pakistani Lok Virsa Digital Library, or the Indian Classical Music online archives, are extremely important in maintaining traditional music, as well as offering culturally relevant pedagogical resources. A juxtaposition of these environments shows that the issue of cultural representation is one of the key ones. The Western repositories are found to favor classical and contemporary Western music conventions, leading to an unequal distribution of resources that may push the non-Western music teachers out of the scene in search of culturally appealing resources.

Educators working in cross-cultural or multi-cultural classes often complain that they have a hard time locating authentic materials that represent the various musical systems, including raga-based compositions, pentatonic folk scales, local percussional traditions and local practice of performance. Where these materials exist, they might lack contextual notes, language translations or teaching guides that help students use the materials in the classroom. Cross-cultural digital repositories are also not similar in terms of technological design. The western platforms are frequently integrated with sophisticated search features, standardized metadata, and intuitive designs, giving the ability to filter the material by genres, composers, time, instrument, and level of instruction. These design attributes highly decrease the cognitive burdens on educators, and they enable them to incorporate resources effectively into lesson plans. Conversely, developing context repositories might face a problem in terms of inconsistent classification, inadequate metadata tagging, or an out-of-date interface. These barriers may demoralize the teachers to maximize the resources available, particularly teachers who are not well-versed in digital literacy. Nonetheless, cross-cultural viewpoints demonstrate novel practices coming out of the resource-constrained settings. South Asian or African teacher South Asian or African teachers often use community-based digital archives, social media sharing communities, and local repositories, which are created in partnership with local cultural institutions. Such websites or semi-formal websites frequently contain videos of performances, demonstrations of instruments, oral narratives, and folk records that are not accessible in the mainstream global databases. Although these sources are not necessarily formally academic or curated, high cultural authenticity and pedagogical value are frequently found in these sources, especially in teaching traditional or local music. Another dimension that is significant in the comparison of digital music repositories is pedagogical relevance.

Standardized notation, ensemble arrangements and scaffolded skill-development activities are Western materials that are often compatible with structured curricula. Conversely, a number of non-Western repositories are more oriented to cultural preservation and do not offer much pedagogy (but they have plenty of content). The multi-cultural nature of teachers teaching across cultural lines occasionally demands the reorganization or

reinterpretation of resources in accordance with the curriculum requirements, particularly where one must educate a heterogeneous group of learners, or to coordinate multiculturalism in the curriculum. In addition, the social and cultural values that music can have differ depending on the situation. Digital materials may be applied in Western music learning to develop cognitive ability, performance accuracy and theoretical literacy. Music in most non-Western cultures, however, is also deeply rooted in communal rituals, narratives and spirituality and identification. Digital repositories that are not able to record these cultural layers may tend to present the music as decontextualized artifacts instead of living practices. This shows the need to incorporate repositories that incorporate ethnographic descriptions, contexts of performance, as well as cultural stories to enhance knowledge of world music traditions among the students. Linguistic factors also dictate the cross-cultural access. Most of the world's repositories contain metadata, instructions, and annotations predominantly in the English language, which may become a hindrance to teachers in non-English-speaking areas. Even though translation applications and multilingual interfaces are slowly becoming better, accessibility is still constrained by linguistic biases. Western repositories are distinguished by their high-technological level of hosting, curating, and cultural coverage, but they have lower levels of usability and digitization; whereas non-Western repositories have a richness of cultural content and varying degrees of usability and technological advancement. Cross-cultural music education must be strengthened by improving global digital infrastructure, promoting equal representation of musical practices, establishing metadata standards, offering multilingual access, and developing pedagogically suitable resources.

Finally, cultural interaction, creative learning, and inclusive music education may be beneficial tools for digital repositories if they are developed and supported culturally and educationally from the start. The study also observes the continuing importance of print media in interpreting global technological trends. By examining these procedures, the study contributes to an improved sympathetic of the composite link between technological advancement, cultural diversity, teaching, and learning. It goes beyond the basic differences of digital vs print to investigate the multi-layered realities of convenience, justice, or sustainability of culture in music

instruction (D'Agostino, 2020).

Research Objective

The purpose of this research is to analyze the transition from print-based to digital-based resources for music teaching by comparing their availability in different cultural environments. It investigates how trainers utilize and modify digital repository sources, determines the technological, cultural, and pedagogical aspects that influence accessibility, and examines the cultural significance and acceptability of internet-based information. The study also looks into hurdles, including infrastructure, licensing, and digital literacy. Overall, the work aims to help establish more fair and culturally relevant digital repositories for the study of music. The digital transformation has greatly reshaped the education environment, as teachers and learners can now access different instructional resources in repositories that are located around the globe.

Literature Review

The use of digital repositories, online databases, and interactive platforms has become more prevalent in the field of music education, as demonstrated by the most recent studies. Numerous academics have investigated not only the success rate of these types of materials but also the variations of accessibility in various cultural contexts (Ahmad, 2024). Research performed both before and after the COVID-19 pandemic strengthened this particular field of study, as academics began to record how the shift from print to digital media affected resource availability, teaching quality, along student learning experiences (Song et al., 2023).

A significant comparative study conducted by numerous music education experts between the years 2021 and 2023 revealed that teachers significantly chose digital repositories rather than textbooks in print form due to their instant accessibility, larger repertoire access, and flexibility to customize resources to varied student demands (Cui et al., 2024). Teachers from various countries claimed that internet-based musical libraries, publicly accessible educational resources, made it easier to choose culturally appropriate musical scenarios instead of traditional print book collections, which frequently represented only Western musical cultural practices. These findings are consistent with an increasing number of data suggesting that multi-cultural

workshops are enhanced by teachers having access to various multimedia resources representing global musical traditions (Chen, 2022). Empirical analyses of both digital and printed resources have also focused on actual educational outcomes. Furthermore, a series of experiments conducted between 2020 and 2024 discovered that, although printed guide methods still provide organized evolution and resilience, digital materials considerably improve engagement by enabling students to engage with audio-visual examples, replay choices, and annotated results (Mutia et al., 2024). In empirical research that was conducted with music theory, it was revealed that students who used digital repositories with embedded musical connections beat those who just used printed textbook theories on identification and evaluation activities. By conducting the interviews of Teachers in this research, it was found that online platforms made it simpler to create scaffolding courses around culturally diverse audio samples, which were not readily accessible in printed materials (Schmidt-Jones, 2021). An additional experimental investigation that compared printed valuable teaching guides with digital educational methods demonstrated that written materials facilitated basic techniques development, whereas electronic resources strengthened motivation by allowing learners to utilize appropriate cultural repertoire as well as video tutorials aligned with their interests and background (Kladder, 2020). Apart from this, it was examined that a steadily increasing number of studies emphasize accessibility problems in different socioeconomic contexts. By examining it was highlighted that internet-based repositories cannot be equally available or created throughout the world (Fan et al., 2024). In addition, Research investigations conducted in Southeast Asia, South Africa, India, and Brazil, discovered that, while digital repositories offer a wealth of teaching resources, but their application has been restricted in some regions due to a lack of consistent access to the internet, restricted organizational membership budgets, and inadequate language-specific content. Teachers in such environments indicated a stronger reliance on printed materials since they are physical, simple to use and unaffected by connectivity concerns. However, the same research also revealed that teachers drastically change their teaching methods when digital repositories are established regionally, such as national archives for traditional music, freely

accessible regional musical repertoire databases, or culturally specific musical libraries (Papadakis et al., 2024). They prefer online accessibility because it is convenient and relevant to their culture. This indicates how cultural representation inside repositories influences instructors' decisions between digital and printed materials. Other quantitative comparisons between cultures show how digital repositories alter the ways in which music trainers interact with educational information. A study comparing trainers in East Asia, the Middle East and Europe discovered that teachers in technologically advanced workplaces used digital resources not just for accessibility but also for tailoring classes, remixing information, and sharing modified versions with others (Ho et al., 2023). On the other hand, countries that depended primarily on printed resources had more rigid teaching procedures, less repertoire variation, and fewer chances for cooperation.

One multinational assessment of over 400 music trainers discovered that digital repositories enabled students to incorporate multinational musical genres such as contemporary, traditional, diasporic, and indigenous, but printed resources preferred to promote a European curriculum (Wang et al., 2024). These comparison findings supported the claim that electronic access promotes cultural diversity in educational supplies far more successfully than print-based supplies. Recently published research has also compared teacher views of print and digital technologies. According to research, qualified instructors who were mostly educated with printed information are more likely to have confidence in printed sources for precision and pedagogical framework, while newer teachers choose digital collections for multimedia integration, searchability, and convenience of content modification (Papadakis et al., 2024). Regardless of age disparities, ethnographic research shows that trainers from numerous countries consistently highlight the significance of controlled, efficient digital repositories, stating that uncontrolled internet resources can lead to discrepancies in teaching effectiveness. This cross-cultural study reveals that internet-based archives work best when they have been professionally maintained, culturally responsive, and in line with institutional or national curricular norms (Cai, 2020). Furthermore, researchers have started recognizing research gaps, pointing out that, while both digital and printed

resources have been evaluated based on educational results, there has been little empirical research on the way cultural context influences the selection, effectiveness, and accessibility of digital repositories for the study of music (Almakaty, 2024). Apart from this, many research investigations look at the positive aspects of technology or intercultural music education, but few analyze how various countries or cultural contexts shift from print availability to digital accessibility or how teachers weigh the advantages and disadvantages. The current findings suggest that the next generation of musical curriculum has become more than just exchanging print with digital representations; it is also about comprehending the way digital repositories may enable equitable access, culturally sensitive methodologies, and an authentic portrayal of worldwide musical cultures.

Methodology

The research design that was used in this comparative study is a mixed-methods study that aims to explore the accessibility of music teaching materials in various cultural backgrounds by using digital repositories. The research is based on content analysis, quantitative access analysis, and cross-cultural comparison to give a broad picture concerning the availability and pedagogical usefulness of digital music resources. The research study is based on quantitative research analysis for measuring the research data through the Smart PLS Algorithm model. The selection of these platforms was done intentionally to obtain the differences in technological progress, cultural representation, and institutional support. The significance of music education and the convenience to international addressees were guaranteed by a purposive sampling

method.

Data Collection and Analysis Methods

There were two primary approaches for data collection: repository content mapping and teacher access surveys. For content mapping, a structured checklist has been established to assess the repositories' features, such as metadata quality, musical genre coverage, access to pedagogical materials, ease of use, language accessibility, and availability of digital versions of materials (e.g., sheet music, audio, video, lesson plans). To allow for comparisons, each repository was evaluated over two weeks using uniform criteria. The research is based on quantitative data analysis for measuring the data used algorithm software related to it. The music teaching materials are considered the independent variable the digital repositories are the dependent variable. The descriptive statistics were used to record and then analyze quantitative measures of the number of culturally diverse items, the effectiveness of search filters, and the frequency of pedagogical guides. A small-scale survey of 30 music educators from different cultural and institutional backgrounds was conducted to learn about user experiences. The survey included both closed and open-ended questions to gather information about the extent to which teachers use repositories, whether they believe accessibility is an issue, whether accessible materials are culturally relevant, and whether they are satisfied with the accessible technological features. The quantitative, repository content analysis triangulation of the measurements enhanced the reliability and validity of outcomes. The principles of ethics included informed consent (participants), anonymity, and the use of data only for academic research.

Smart PLS Algorithm Model

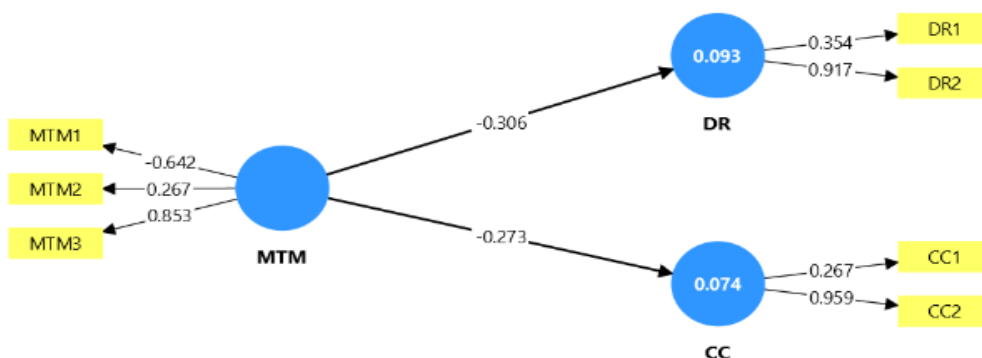


Figure 1: Smart PLS Algorithm Model.

The above Figure 1 model represents the smart PLS algorithm model between MTM, DR, and CC, respectively. The MTM link with -0.642, 0.267, 0.853, positive and some negative relations with them.

Similarly, the MTM shows that negative link with digital repositories but its significant link with them. The DR shows that 35% and 91% positive and significant rates. The CC shows 26% and 95% positive and significant relations with them.

Descriptive Statistical Analysis

Table 1: Results of Descriptive Statistical Analysis.

Name	No.	Mean	Median	Scale Min	Scale Max	Standard Deviation	Excess Kurtosis	Skewness	Cramér-Von Mises P-Value
MTM1	1	1.740	2.000	1.000	3.000	0.687	-0.835	0.400	0.000
MTM2	2	1.820	2.000	1.000	3.000	0.684	-0.840	0.253	0.000
MTM3	3	1.600	2.000	1.000	3.000	0.566	-0.770	0.273	0.000
DR1	4	1.620	2.000	1.000	3.000	0.562	-0.764	0.202	0.000
DR2	5	1.640	2.000	1.000	3.000	0.625	-0.609	0.458	0.000
CC1	6	1.720	2.000	1.000	3.000	0.694	-0.846	0.452	0.000
CC2	7	1.900	2.000	1.000	3.000	0.671	-0.746	0.123	0.000

The results of table 1 describes that the descriptive statistical analysis result shows the mean values, the median rates, also the minimum, maximum values. The standard deviation represents the relation between them. The overall result shows that a significant value is 0.000 shows a 100% significant and positive relation between them. The mean values are 1.740, 1.820, 1.600, 1.620; all of them show a positive average value of mean. The standard deviation rate is 68%, 56%, 62%, 69% also that 67% deviate from the mean. Overall descriptive results concluded that significant relationship between music teaching materials and digital repositories.

Applications

The findings of this comparative study provide a wide variety of applied applications for music educators, curriculum developers, cultural institutions, and education policymakers. Digital sources have the potential to transform the attractiveness of music education in cross-cultural settings by increasing access to a wide diversity of materials, educating innovative teaching methods, and cumulative students' intercultural sympathetic. This section describes the significant applications of digital repository integration in music education, predominantly its impact on instructional practice, cultural protection, technological development, and global associations.

Impact of the Increased Variety of Classroom Resources

International digital repositories can help educate students to a varied range of styles and civilizations, as well as historical circumstances, beyond what is provided in their resident curriculum. This includes traditional Western and native songs of the geography, non-Western percussionist techniques, traditional ragas, and world music forms. This diversity promotes multi-cultural understanding and gratitude among students, permitting them to appreciate music as a universal and culturally entrenched way of expression. Multi-cultural teachers need to have access to repositories that include authentic recordings, coding systems, and relevant descriptions that reflect different cultures, allowing them to progress courses that target various learner personalities (Berehova and Volkov, 2019). The other key application is in curriculum development. Teachers and curriculum designers can align repository resources with national standards and create structured modules that cover global music, ethnomusicology, music theory, and performance-based courses. Western repositories, for example, can support technique-based instructions by providing worldwide symbolization and pedagogical exercises, whereas non-Western sources can be used to enrich lessons with verbalized histories, cultural explanation, execution practice, and community-based performances.

Digital Repository

Curriculum developers are able to employ digital repository material to paradigm components in which students compare listening, cross-cultural music rhythm, and cooperative arrangement developments that may be found in other musical systems. Digital repositories encourage both original entrepreneurship and student modernization. With admittance to a wide variety of musical samples, digital score public library, and sound documentations, students can take part in reproducing, digital composition, sound design, and cross-cultural combination projects. This type of recurrence inspires entrepreneurial thoughtful by authorizing students to make innovative pieces that use musical traditions. Teachers will be able to train students to use repository contents to make multimedia performances, digital albums, cultural documentary films, and classroom exhibitions. These initiatives not only advance musical innovation but also grow digital literacy, project management, and imaginative abilities, all of which are valuable in today's creative industries. Digital repositories can be used to provide different and inclusive training in the classroom. Educators can choose materials that are compatible with various levels of ability, learning styles, and languages. For example, audio-based resources can be implemented with auditory learners or students who have no previous knowledge of Western notation, whereas visual and composed materials can be used in a more structured approach to teaching music theory. Repositories that include multilingual metadata or commentary translated into other languages might be particularly beneficial in classrooms where English is a second language. Furthermore, multi-cultural tools can help teachers confirm the identity of minority or immigrant kids, instilling a sense of belonging and pride in their culture. Digital repositories provide outstanding opportunities for professional development in music education. Teachers might study materials in repositories to have a better understanding of unexpected musical traditions and performance methods. The availability of expertly edited recordings, musical ethnographic notes, and pedagogical films helps teachers enhance their content understanding and teaching methods (Wright, 2017).

Teacher Training Workshops and Training Modules

Teacher training seminars and modules based on repository content can help teachers include global music traditions into their teaching repertoire.

Because the repositories are always growing, they can also serve as an intersection for teacher-to-teacher collaboration, allowing educators to share lesson ideas, classroom activities, and culturally aware teaching methods. The other essential use is for cultural preservation and transmission. Several non-Western and traditional musical traditions are in danger of dying, either as a result of expanding socioeconomic concerns or simply because they have not been documented.

Online repositories can be helpful for preserving, storing, and sharing these traditions. Teachers contribute to the preservation and transmission of culture to future generations by incorporating such resources into the curriculum. Students are exposed to musical idioms such as Pashto folk rhythms, African polyrhythms, and Andean panpipe harmonies, which help them develop a feeling of cultural identification and global connection. Schools and cultural institutions can work together to expand digital archives and develop culturally relevant lesson plans.

Assessing Students More Effectively

- Favors the creation of listening exams, comparative analysis assignments and performance-based examinations.
- Enables the making of digital student portfolios through the use of materials in the repository.
- Promotes critical and imaginative review in keeping with the 21st-century skills.

Increasing Access to Resources under Strain

- Offers free/open access materials to schools that have a tight budget.
- Eliminates the usage of costly textbooks or print scores.
- Supports the rural or marginalized communities to get access to good-quality music resources.

Lifelong Learning and Informal Education

- Allows students not enrolled in educational institutions to learn more about the music cultures around the world.
- Funds community music, cultural, and self-directed learning.
- Enhances cultural literacy among the adult learners and hobbyists.



Figure 2: Print and Digital Media in Music Teaching and Learning.

Digital Repositories Facilitate Assessment and Evaluation of Students in the Field of Music

Repository materials can help teachers create performance challenges, listening evaluations, comparative musicology projects, and reflective projects (Figure 2). Students may demonstrate their learning by creating curated digital portfolios that include annotated listening logs, cultural research reflections, and creative reinterpretations of repository works. This teaching technique values cultural knowledge and creativity, and modern music education aligns with worldwide learning objectives. Overall, digital repositories have the potential to revolutionize cross-cultural music education. They enable greater diversity of resources, new teaching methods, new student work, culture, and global collaboration. Digital repositories can be valuable tools for advancing music teaching and learning in the twenty-first century, provided they are supported by fair policy, technology, and culturally appropriate pedagogy.

Discussion

The conclusions of the current comparative study highlight the significant distinctions, opportunities, and limitations related to access to music instructional resources via digital repositories in multi-cultural situations. The findings designate discrepancies in the distribution of advantages from digital platforms across the cultural, technological, and socioeconomic divides, despite the fact that they improved worldwide educational accessibility. This commentary discusses the research findings within the larger discourse of digital equity, cultural representations, and the significance of pedagogical research in music education. Among the key takeaways from the investigation are the variations in

technological improvement between non-Western and Western repositories. Western platforms are also likely to include advanced search features, rich metadata, and high-quality digitization, thus allowing for effective material retrieval. These databases facilitate efficient instruction by saving teachers the time they would otherwise spend searching online for appropriate materials. However, their education typically concentrates on the Western classical traditions, therefore reducing their application to the culturally varied courses. By contrast, Asian, African, and Latin American repositories frequently have significant cultural content but do not have the interface quality, uniformity in labelling, or educational scaffolding that is easily integrated into the classroom. This disparity illustrates that an inconsistency between technology and repositories might be beneficial in one area but detrimental in another. Another issue identified in the study is the continuing cultural mismatch in the digital archive.

The Western tradition continued to be over-represented, while many non-Western traditions, especially indigenous, oral, and community-based music, are under-digitized or insufficiently documented. This difference raises serious concerns about digital imperialism and the risk of using digital tools to reinforce cultural power structures. Educators who collaborate with multi-cultural or cross-cultural classrooms generally demand material that is suggestive of a wide range of musical traditions; its scarcity prevents culturally sensitive instruction. Furthermore, when non-Western materials are available, they may not be contextually translated or include performance notes, resulting in a lack of contextualization and consequently an incomplete learning experience for students. Providing equal music education possibilities has been a significant difficulty in multi-cultural music education during

the last few decades. This approach necessitates the customization of curricula and methods to each student's cultural background during a period of rapid population change. Nowadays, teaching practices in many countries range greatly. For example, in Russia and Western Europe, music education is centered on a personalized approach. Every student is never left alone; instead, they are guided by their teachers.

Conclusion

This comparative investigation has addressed the topic of access to musical teaching resources on digital repositories in cross-cultural circumstances, revealing a complex situation influenced by technology potential, cultural representation, pedagogical perspective, and socioeconomic reality. The findings show that digital repositories are effective educational tools that can be used to democratize access to a diverse range of musical content; however, they also reflect a broader set of global inequalities, which may limit educators' ability to use such applications effectively. One of the important conclusions is that technology deficiencies have a significant impact on repositories' usability and accessibility. Western online libraries receive more funding, are more organized, and have more advanced metadata methods and user-friendly interfaces. The research effort enabled us to identify the differences between research papers and musical artworks submitted by competitors from diverse countries in two competitions. European, Indian, and Chinese music all have distinct components such as genres, tunes, harmony, instruments, and styles. So, the basic seven-step scale in India does not have a tight fixation of the sound pitch, whereas the European scale has a mechanical split into 12 equal segments, which directly fixes the tones. The Chinese scale appears to be quite similar to the European scale, yet some tones have a different pitch. In such a scenario, the perception of pure sound would yield opposing conclusions. European, Indian, and Chinese music are distinguished by distinct genre and style systems that have no common parts but are defined by specifications, providing meanings, and obligatory requirements. The system of harmony and polyphony is limited to European music, whereas improvisation is central to Indian musical performance. Generalizing the contrasts, it appears that discretization is the dominant trend in European music, whereas flow is primarily defined in Asian art. Many more differences could be

discovered by comparing music from various continents. Visible differences among them preclude the feasibility of evaluating them fairly using a basic universal set of criteria. The evaluation procedure places increased demands on the jury's knowledge of each cultural tradition's background and study scope in order to provide an adequate judgment of both research results and vocal performance. Musical internet competitions play an important role in promoting and safeguarding national traditions. Competitions held on virtual platforms also promote multi-cultural opportunities in music teacher education, such as sharing a national variety of musical styles and elements, approaches to explain the meaning of the music, challenges and relevant issues in music art and education research work, collecting e-source records that demonstrate the diversity of traditional musical performances in different countries, and gathering musical experiences to preserve cultural.

Comparing cultures encourages cross-cultural communication and deepens understanding of both one's own and another's customs. In order to improve regular assessment tools, which included the criteria relevance of the presented issue in the context of national traditions and world perspectives, the depth, justification of the data, structural logic of the study, confident presentation of research work in front of the jury during the competition; the representation of an expressive artistic image, artistic performance confidence, performing arts culture, and technical level in sound competency for the vocal competition, we established the main trend of development which will allow to promote tolerance for different cultural traditions. This trend should include a set of criteria for the evaluation of national color and traditional features of musical art in the context of its history, theory, and artistic performance presented by competitors from different countries. The following suggestions should be taken into consideration in order to propose the multi-cultural approach as offering essential possibilities in music teacher education and online competitions in research work or musical performance. A member of the jury shall be chosen from among experts who are qualified to provide professional judgment for research studies that present folk traditions and/or national musical performances. The design of assessment tools should include criteria that reflect or depend on the unique qualities of a nation's culture. When creating an evaluation instrument, important factors such as

national culture-specific genres, traditional musical expressions, methods for conveying meaning, pertinent research topics, and characteristics of traditional musical performance styles should be taken into account. In addition to the above-mentioned, the multi-cultural approach in education through the use of art influences the teaching performance that follows. A new set of pedagogical approaches and techniques spanning opposing ways of human thinking may be inspired by the variety of visual representations that use vast expressiveness to portray the style of thinking.

Recommendations

- Reservation and digitalize under-represented musical backgrounds, including original and traditional music. Cooperate with cultural organizations, local artists, and the public to increase culturally relevant content.
- Include appropriate notes, conversions, and cultural clarifications together with the musical components.
- Improve Non-Western repository promotion interfaces with progressive search features, tagging processes, and easy triangulation.
- Use systematic metadata methods for better search accuracy and cross-platform compatibility.
- Add multimedia (audio, video, collaborating scores) to content to meet varied learning necessities.

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