



Digital transformation of higher music education in Ukraine: Challenges and innovative practices

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ABSTRACT

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The study aims to examine how digital transformation is reshaping higher music education, a field that relies on performance-based pedagogy, ensemble interaction, and tacit knowledge transmission. It investigates how these distinctive requirements were affected by the rapid shift to online and hybrid learning, especially in Ukraine, where digitalization intensified due to the COVID-19 pandemic and the ongoing war. The research adopts a mixed-method approach that combines institutional analysis, student and faculty perspectives, and case vignettes from leading Ukrainian music academies. The primary empirical component focuses on Bohdan Khmelnytsky Melitopol State Pedagogical University, which has become a key site for experimenting with digitally supported music instruction and assessment. The findings indicate that persistent systemic challenges remain, including infrastructural limitations, unequal digital access, and significant obstacles in adapting performance evaluation to online environments. At the same time, the study identifies emerging innovative practices such as hybrid juries, asynchronous performance submissions, and cross-border masterclasses that illustrate the adaptability and resilience of music programs under crisis conditions. The results suggest that digital transformation in higher music education is not limited to technological adoption but involves deeper shifts in pedagogy, assessment frameworks, and institutional governance. These insights highlight how Ukraine's experience can inform the development of sustainable, inclusive, and digitally connected music education systems internationally.

Contribution/Originality: This study contributes to the existing literature by examining how performance-based music disciplines adapt to digital transformation in crisis conditions. It is one of the few studies investigating hybrid pedagogical and governance models in higher music education. The paper's primary contribution is documenting Ukraine's resilience-oriented digital innovations within a global reform context.

1. INTRODUCTION

The digital revolution in higher education has been one of the prominent themes of the twenty-first century. Universities worldwide are reconsidering their strategies for imparting knowledge, shaping professionals, and preparing them to adapt to the swiftly evolving technological landscape (Ponomarenko, Rayevnyeva, Yermachenko, Aksonova, & Brovko, 2021; Sushchenko, Andrushchenko, & Sushchenko, 2022). These changes, however, can be observed in a wide range of areas, but higher music education is a separate and complicated situation. In contrast to other academic fields, where theoretical learning or book reading is more important, the teaching of music is directly tied to performance, practice-based learning, and knowledge that a teacher imparts to a learner (Alekseenko & Rakich,

2020; Ovcharenko, Samoilenko, Moskva, & Chebotarenko, 2020). These peculiarities precondition the process of digitalization of music education, as it demands not only the adjustment of tools but also a redesign of the pedagogy itself (Karas, Romaniuk, Novosiadla, Obukh, & Zvarychuk, 2021).

Ukraine is a useful case for studying this change. Traditionally, in Ukrainian conservatoires and academies, the relationship between a master and an apprentice, face-to-face rehearsals, and live performances were the fundamental tools of education (Poplavskyi, 2021; Umrykhina, 2019). These models performed well in rehearsal rooms and concert halls. However, the ongoing war and COVID-19 pandemic have shaken these traditions to an unprecedented extent (Havrilova, Ishutina, Zamorotska, & Kassim, 2019; Londar & Pietsch, 2023). It was the first time in history that institutions that opposed digital learning had to move lessons, rehearsals, and assessments online (Hereha & Korol, 2021). This exposure highlighted the flaws of existing systems and how digital innovation can keep education alive in optimal conditions (Imbesi, Keppie, & Vaes, 2023).

This transition has many problems. Online platforms were a barrier to real-time ensemble practice due to latency and sound compression; thus, the application of synchronous performance was close to impossible unless the technical solutions were highly developed (Konovalova, Zhang, & Sun, 2020; Rexhepi, Breznica, & Rexhepi, 2024). Most students did not have equal access to good instruments, recording devices, and reliable Internet connections (Kondratova, 2019; Melkumyan & Sahakyan, 2024).

At the same time, faculty (with the majority of their training centered around face-to-face pedagogies) had to quickly learn the online platforms and test out new strategies (Karkina et al., 2023; Zhuravleva & Veselova, 2020). These problems were exacerbated by institutional barriers, since most conservatoires were ill-equipped to adapt quickly due to their lack of infrastructure and administrative flexibility (Khyzhko, 2019; Nizhenkovska, Reva, Chkhalo, But, & Manchenko, 2022). Nevertheless, some innovative methods, such as hybrid juries, asynchronous submissions, collaborative recording, and cross-border masterclasses, have started to appear, which testifies to the fact that the process of music education in Ukraine can withstand pressure (Pereverzeva, Anufrieva, Shcherbakova, Kuznetsova, & Zharkova, 2021; Varnavska, Viktorova, & Rymar, 2021).

The importance of this work is that this change is explained in full. Digital transformation is not a matter of technology introduction but the redesigning of pedagogy, evaluation, governance, and culture of institutions (Gorbul & Rusakov, 2022; Siliutina, Tytar, Barbash, Petrenko, & Yepyk, 2024). This also necessitates a reassessment of music teaching, assessment, and mentoring in the academic and creative aspects (Malaschenko, Antonova, Knyazeva, Belokon, & Pechersky, 2020).

The case of Ukraine sheds light not only on resourcefulness in a time of crisis but also on the systematic inequalities that escalated in a crisis situation (Khyzhko, 2019; Mospan & Sysoieva, 2022).

This study had three objectives. First, it determines the universal challenges encountered by Ukrainian higher music institutions in digital transformation. Second, it appraises the practices that have been developed in response to this issue. Third, it makes overall inferences concerning the ways music education may go beyond shallow digitalization to become truly systemic (Cant & Wiid, 2023; Rexhepi et al., 2024).

Lastly, the transformation to digital in Ukraine cannot be regarded as a temporary adaptation but rather as an evolution of the expression of the work of teaching, sustaining, and developing music education in the country. The innovations that have occurred during the pandemic and war are likely to become sustainable and will change not only the student experience but also the situation with knowledge spread throughout the world (Kiv et al., 2023; Sushchenko et al., 2022). Ukraine is a key case study in this regard in the digital era of music education.

Figure 1 shows the conceptual model of the associations among external disruptions, institutional responses, and pedagogical outcomes of the digitalization of Ukrainian higher music education.

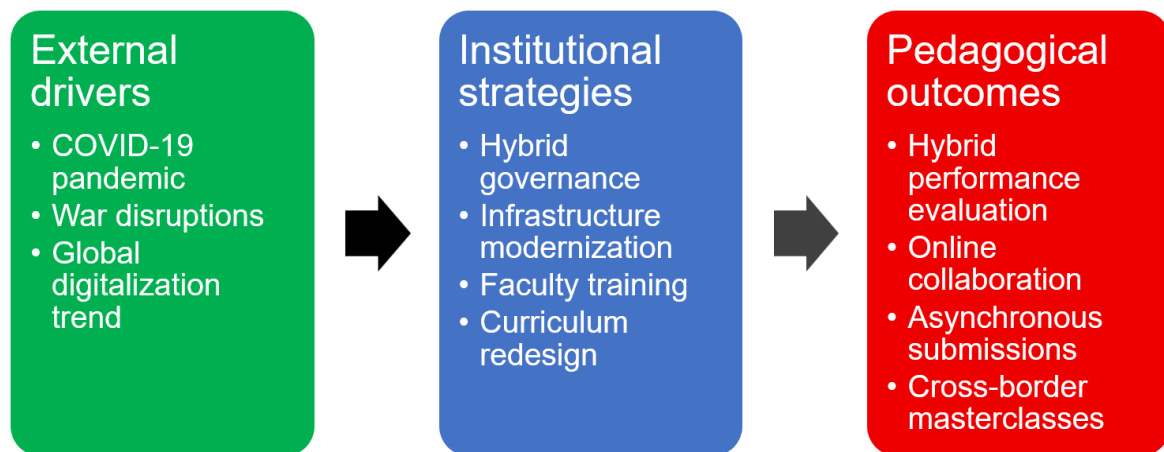


Figure 1. Conceptual framework of digital transformation in higher music education in Ukraine.

The figure illustrates how external pressures (Pandemic, war, and global digitalization) influence institutional strategies that lead to pedagogical innovation and resilience.

2. REVIEW OF LITERATURE

2.1. Conceptual Framework: Activity Theory

In the present study, Activity Theory (Engeström, 1987) is used to conceptualize the digital transformation of music education in higher educational institutions in Ukraine. Activity Theory considers human learning a process that includes subjects (educators and students), objects (educational goals), and mediating artifacts (digital tools, institutional policies, and community norms). This view is especially applicable in performance-based disciplines, in which the transition to digital education is transforming the existing relationships between learners, teachers, and technologies. Through this framework, the paper perceives the accelerated digitalization of Ukraine as more than a simple technical adjustment but as a reorganization of educational practice, cultural values, and institutional governance.

2.2. International Understanding of Digital Pedagogy

The consensus among scholars is that digital transformation has transformed pedagogical interactions in the higher education sector (Garrison & Anderson, 2011; Redecker, 2020). This change was accelerated by the COVID-19 pandemic, which forced institutions to implement hybrid and online delivery at a faster pace than ever before (Hodges, Moore, Lockee, Trust, & Bond, 2020). Science and humanities learning management systems, instructional design, and digital assessment have also been researched (Bond, Bedenlier, Marín, & Händel, 2021). Nonetheless, the fields of creativity and performance-based research remain under-researched (Schippers, 2021; Waldron, 2020). According to (Partti & Westerlund, 2013), artistic education relies on embodiment, social interaction, and tacit transmission, areas that are difficult to digitize. Thus, even though global studies recognize the potential of digital pedagogy, they also demonstrate a lapse in cognition regarding how disciplines such as music can balance the mediation of technology with artistry.

2.3. Music and Arts Education Digitalization

Over the past ten years, there has been a rise in the quest by music education researchers to understand the issues surrounding the use of technology in performance learning. As observed by Biasutti, Antonini Philippe, and Schiavio (2022) and Barnard, Arias, and Thielemans (2021), the online learning environment does not always recreate the synchronous ensemble dynamics, which is one of the essential peculiarities of conservatory training. Nonetheless, the pandemic triggered innovation in pedagogy, and virtual orchestras, asynchronous submission of performances, and remote collaborations became acceptable options (Dammers & LoPresti, 2020; Koutsoupidou, 2014). Research has

also indicated that reflective learning and accessibility have improved through digital recording and feedback devices (Parkes & Wexler, 2012). Nevertheless, the extant literature is purely descriptive and does not pay much attention to the long-term institutional and cultural implications. This underscores the necessity of theoretical frameworks that describe how conservatoires are restructured under digital pressure.

2.4. Digital Transformation of the Ukrainian Scholarship

Scholars in Ukraine have started reporting the digital transformation of national conservatories, especially throughout the COVID-19 pandemic and the ensuing wartime upheavals (Rexhepi et al., 2024; Sushchenko et al., 2022). These studies list infrastructure, lack of digital literacy among faculty, and the difficulty of measuring live performance using online forms as some of the major barriers. Pilot projects to integrate music technology, digital archiving, and online masterclasses have been undertaken in local institutions, such as the Bohdan Khmelnytsky Melitopol State Pedagogical University and the National Music Academy of Ukraine (Kiv et al., 2023; Kuchyn et al., 2022). Nonetheless, most Ukrainian studies are context-dependent and do not relate to more general theoretical aspects. Few studies have delved into the systematic study of institutional resilience, which is the ability to maintain learning and cultural identity during digitalization caused by a crisis.

2.5. Thematic Synthesis of Previous Studies

Table 1 summarizes the prevailing research streams on the topic of digital transformation in higher music education to unite the main topics that arise within research on this topic by international and Ukrainian scholars.

Table 1. Prevailing research streams in digital transformation of higher music education (International and Ukrainian Scholars).

Theme	Scholarly focus	Key authors	Identified gaps
Pedagogical digitalization	Technology-mediated learning, hybrid teaching models, and online assessment tools.	Garrison and Anderson (2011); Redecker (2020); and Hodges et al. (2020)	Lack of integration of creative disciplines into mainstream digital pedagogy frameworks.
Performance-based challenges	Impact of digitalization on embodiment, collaboration, and tacit learning.	Partti and Westerlund (2013), Schippers (2021), and Waldron (2020)	Limited empirical models explaining adaptation in music performance education.
Institutional transformation	Organizational restructuring, digital leadership, policy adaptation.	Barnard et al. (2021) and Biasutti et al. (2022)	Need for cross-cultural evidence linking crisis and innovation in conservatories.
Ukrainian context	National reforms, hybrid learning pilots, wartime adaptation.	Sushchenko et al. (2022); Kiv et al. (2023) and Kuchyn et al. (2022)	Minimal theoretical engagement and limited global comparative framing.

2.6. Research Contribution and Presentation Focus

The collective literature indicates that while global higher education has undergone rapid digital transformation, the creative and performance-based sectors, particularly music, have not yet been fully theorized. Current studies are divided into the globalization paradigm of digital pedagogy and local descriptive studies. Empirical Ukrainian scholarship rarely addresses international theoretical perspectives. Consequently, the impact of institutional resilience and pedagogical redesign on each other in crisis situations is not well understood. This study fills these gaps by examining higher music institutions in Ukraine as dynamic systems of activities under external pressures, internal regulation, and mediation by technology.

3. METHODOLOGY

3.1. Research Design

The research design of this study is mixed methods, which incorporates both the quantitative and qualitative research approaches to gain a comprehensive understanding of the digital transformation of higher music education

in Ukraine. The combined method has been used because digitalization in the performance-based field is a matter of both quantifiable institutional shifts and a complicated experiential and cultural layer. The quantitative analysis enabled the identification of trends in the responses of students and faculty, whereas the qualitative analysis captured stories of resilience, adaptation, and innovation in the conservatoires.

3.2. Sites and Participants of the Study

The primary experimental and observational target was Bohdan Khmelnytsky Melitopol State Pedagogical University, and the key case was testing the hybrid models of music education. Additional experience was based on Kyiv National Musical Academy, Lviv National Academy of Music, and other regional conservatories that differed in terms of infrastructure and experience of exposure to war-related disruptions.

The participants included the following.

- The participants were faculty members ($n = 42$) engaged in music performance, music theory, and music pedagogy.
- Undergraduate and master's level students ($n = 120$) from various institutions.
- Educational reform, institutional governance, and policymakers ($n = 10$).

The participants were all selected through purposive sampling, and care was taken to include those who were directly involved in instruction, learning, or managing digital transformation during the crisis.

3.3. Data Collection Instruments

The following tools were used to gather information.

3.3.1. Structured Questionnaire

This study was conducted to determine the quantitative data on the use of digital tools, issues, faculty preparedness, and student experiences.

3.3.2. Semi-Structured Interviews

Online, held in cooperation with faculty and administrators to discuss institutional decision-making and strategies for adapting to the pandemic and war.

3.3.3. Institutional Documents and Reports

The analysis of sources such as official reports, curriculum changes, and policy circulars was used to trace the changes in governance and accreditation standards regarding digitalization.

3.3.4. Observation Records and Case Vignettes

To provide context and triangulate the results, field notes from virtual classes, hybrid juries, and ensemble sessions were used.

3.4. Data Collection Procedure

Data were collected between January 2022 and March 2024 in the following three phases.

3.4.1. Phase I Survey Administration

Institutional channels were used to distribute the questionnaires electronically. The data were compiled and anonymized as an SPSS file to handle basic statistics.

3.4.2. Phase II: Interviews and Case Documentation

Follow-up interviews were conducted using Zoom and Google Meet. Informed consent was obtained from the participants, and the recordings were transcribed for thematic analysis.

3.4.3. Phase III – Institutional Data Review

Relevant university policy documents, accreditation reports, and internal memos were reviewed to put quantitative trends in the context of institutional decisions.

3.5. Data Analysis

Descriptive statistics (percentages, means, and frequency distributions) were used to analyze quantitative data to establish the levels of digital readiness, equity in access, and faculty adaptation.

Data relevance: NVivo was used to code qualitative data thematically, according to the six steps of thematic analysis presented by Braun and Clarke (2006). New categories included in the comparison of cases (pedagogical innovation, institutional resilience, and cultural resistance) to determine convergences and divergences. The merge analysis has been able to provide the five major drivers and areas of challenge discussed in the Results section.

3.6. Validity and Reliability

To ensure validity.

- Triangulation was ensured by using several data sources (surveys, interviews, and documents).
- Member checking was carried out with participants, validating and making sense of their responses.
- Collaborative debriefing with fellow co-researchers ensured that there was agreement between the themes and the theoretical framework (Activity Theory).
- Reliability was enhanced through the consistency of data collection measures and the application of common tools at all locations.

3.7. Ethical Considerations

Bohdan Khmelnytsky Melitopol State Pedagogical University has an Institutional Review Board (IRB) that provides ethical approval.

Every participant was aware of the study's purpose, anonymity, and the voluntary nature of the research. Data were kept safely and were not used in any manner other than for academic purposes.

Since the war situation was still ongoing, additional precautions were taken to prevent psychological torture and the leaking of confidential details during the interviews.

3.8. Summary

Such an approach was a solid basis for studying how Ukrainian higher musical education institutions reacted to unparalleled crises. Quantitative evidence and the application of qualitative insights allow one to have a comprehensive picture of the change between digitalization and digital transformation, which is represented in the following section.

4. RESULTS AND FINDINGS: UKRAINIAN HIGHER MUSIC EDUCATION DIGITAL TRANSFORMATION DRIVERS

Four main forces were found to influence the digital transformation of higher music education in Ukraine: the COVID-19 pandemic, wartime disruption, globalization and international cooperation, and institutional policy reform. These external and internal forces came together to hasten pedagogy, governance, and performance practice transformations to make traditional conservatory models digitally adaptive learning ecologies.

4.1. COVID-19 Pandemic

The first and most disruptive catalyst of change was the onset of COVID-19 in 2020. Ukrainian conservatories relied on face-to-face mentorship and ensemble performances; however, they had to cancel face-to-face rehearsals and performances (Havrilova et al., 2019; Hereha & Korol, 2021). Faculty members who were not previously acquainted with digital technologies needed to quickly adapt to online information delivery through video conferencing and asynchronous feedback. Students worked alone and sent recordings rather than live performances.

This suddenly changed the nature of music education. In the absence of physical presence, feedback mechanisms for intonation, phrasing, and ensemble coordination were modified by teachers (Ovcharenko et al., 2020). Although technological restrictions remained, the crisis inspired experimentation in the fields of music theory, composition, and musicology courses (Alekseenko & Rakich, 2020). Nevertheless, the pandemic removed the traditionally high resistance to technology and laid the groundwork for further digital innovation (Mospan & Sysoieva, 2022; Rexhepi et al., 2024).

4.2. Wartime Disruption

The next war compounded digital transformation and made adaptation a matter of survival. Institutions have encountered not only pedagogical barriers but also physical destruction, displacement of faculty, and unreliable power and Internet (Londar & Pietsch, 2023). Online platforms were the only options that could be used to provide instruction in this context (Imbesi et al., 2023).

Necessity is the mother of innovation. Conservatories introduced hybrid juries, and performances could be recorded and judged remotely. Others were the first to experiment with asynchronous ensemble works, in which individual recordings were combined into composite group work (Kiv et al., 2023). Since the students were displaced, they participated in international masterclasses and online workshop sessions with foreign musicians (Karas et al., 2021). These experiences showed that online education was not an analog to face-to-face learning but a novel form of teamwork in the arts and institutional sustainability (Gorbul & Rusakov, 2022).

4.3. Globalization and International Cooperation

Globalization has offered new opportunities and created competitive pressures at the same time. Prior to the crises, Ukrainian artists were engaged in a few exchanges and contests with other countries, and now, through digital connectivity, they can use remote access to world stages, classes, and collaborations (Varnavska et al., 2021). Students worked virtually with world-renowned performers, taking part in online festivals and workshops (Karkina et al., 2023).

However, this exposure created expectations. Institutions were forced to meet international requirements for digital literacy, technological infrastructure, and pedagogical practices (Pashchenko, Seheda, Tereshchenko, & Chervonska, 2025). The increasing competition in the global environment has necessitated the use of learning management systems, online libraries, and digital assessment models (Pereverzeva et al., 2021; Poplavskyi, 2021). Globalization has acted as an entry point to innovation and a system of accountability.

4.4. Institutional and Policy Reforms

National and institutional reformation, alongside external pressure, enabled modernization. Ukrainian policymakers had started to match higher education with international standards even prior to the war (Siliutina et al., 2024). Such reforms were hastened during crises, which led conservatories to provide music technology, digital production, and online collaboration in performance-based curricula (Kondratova, 2019).

Digital capacity has emerged as a parameter in accreditation procedures, which strengthens accountability and transparency with digital assessment systems (Kuchyn et al., 2022). These changes provided a policy framework that gave credence to technological innovation in academic establishments (Cant & Wiid, 2023; Ponomarenko et al., 2021).

4.5. Interplay of Drivers

These four drivers, pandemic, war, globalization, and institutional reform, have not been functioning as separate forces but have been operating in a synergistic network of pressures and incentives. The pandemic eliminated the opposition to digital resources, the war accelerated innovations, globalization developed new relationships and competition norms, and policy changes institutionalized them (Melkumyan & Sahakyan, 2024; Nizhenkovska et al., 2022).

The combination of these overlapping forces has forced the Ukrainian higher music education system into a phase of structural change. What started as emergency improvisation became conscious, long-term digital assimilation, a systemic renegotiation of pedagogy and government.

4.6. Summary of Findings

The exploration shows that the digital transformation of higher music education in Ukraine is multidimensional, that is, technological, institutional, and cultural. Crises act as catalysts for innovation, requiring institutions to face pre-existing pedagogical inflexibility and infrastructural restraints.

The drivers, their effects, and long-term implications are summarized in Table 2.

Table 2. Drivers of digital transformation in higher music education in Ukraine.

Driver	Description	Key effects	Long-term implications
COVID-19 pandemic	Closure of campuses and sudden reliance on online learning.	Broke resistance to digital tools; identified subjects adaptable to remote delivery.	Established a foundation for hybrid and blended learning.
Wartime disruption	Destruction, displacement, unstable infrastructure.	Made digital platforms essential; fostered hybrid juries and asynchronous ensembles.	Strengthened resilience; digitalization as a necessity, not a choice.
Globalization & international collaboration	Expansion of cross-border learning and performance.	Enhanced student exposure and institutional benchmarking.	Raised national ambitions; accelerated integration with global standards.
Institutional reform & policy shifts	Modernization of curricula and digital literacy requirements.	Standardized digital systems and improved accountability.	Created sustainable policy frameworks; linked digital capacity to accreditation.
Interplay of drivers	Interaction among crises, reforms, and globalization.	Reinforced rapid, collective adaptation.	Solidified digital transformation as a structural and cultural change.

The comparative study of the pre- and post-digitalization practices indicates a solid pedagogical shift. Prior to 2020, teaching at Ukrainian conservatoires relied nearly entirely on in-person mentorship, on-stage rehearsal of ensembles, and on-stage performance juried by panelists. After the swift shift to the use of digital tools, mixed formats that involve asynchronous performance recording, remote juror evaluation, and theoretical teaching online became the convention.

This transformation is visualized in Figure 2, which compares the older model of traditional and instructor-centered teaching with the new technology-mediated model that focuses on collaboration, flexibility, and resilience of institutions. This number shows that the adaptation in the case of the pandemic and afterward, when governed by the conditions of a war, caused a far wider reconsideration of the structure of pedagogy and governance.

Overall, the results show that Ukrainian conservatoires, despite being initially unprepared in terms of digital teaching, have developed rapidly through experimentation that has arisen as a necessity. The intersection of technological urgency, policy change, and creative endurance does not inspire a temporary workaround but a long-lasting reconfiguration of the creation and sharing of artistic knowledge and its evaluation.

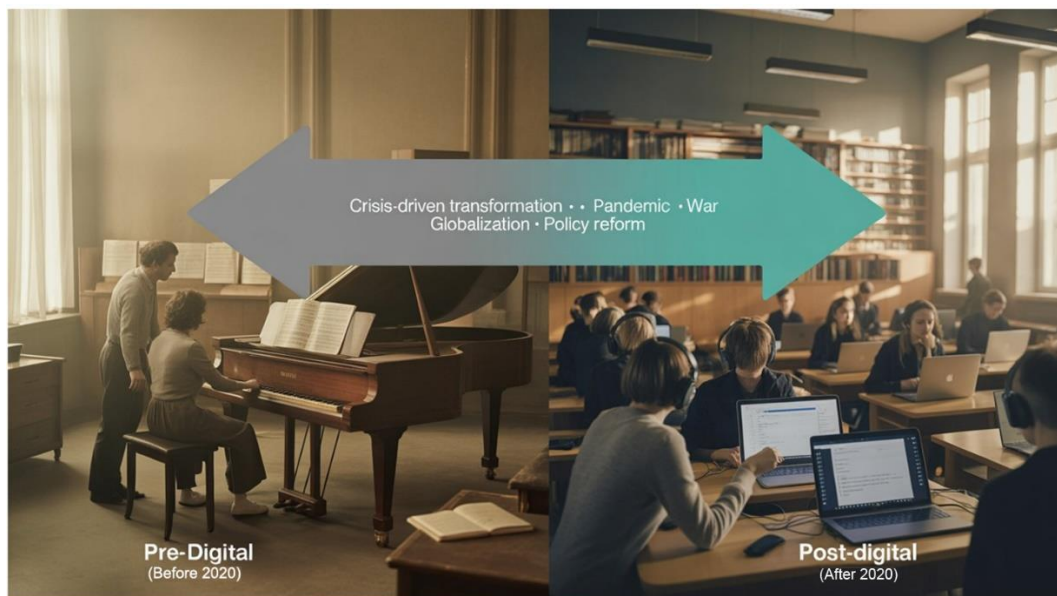


Figure 2. Comparative shift in higher music-education pedagogy in Ukraine, before and after digital transformation.

Figure 2 graphically illustrates such a transformation by comparing the old instructor-centered models with the new technology-mediated models, which focus on collaboration, flexibility, and institutional resilience. The numbers highlight how the adaptation that arose due to the crisis initially during the pandemic and subsequently under wartime conditions spurred a more fundamental structural reconsideration of pedagogy and governance.

The results show that Ukrainian conservatoires, although initially inadequate in terms of digital learning, have developed at an alarming pace due to the need to experiment. Such an intersection of technological imperative, policy change, and creative lassitude reflects no quick workaround but a restructuring of artistic knowledge production, distribution, and judgment, which is here to stay.

5. DISCUSSION: DIGITALIZATION FOR TRANSFORMATION

The findings underscore the fact that not only have the institutions of higher music education in Ukraine been digitalized, but they have also changed. Digitalization, which can be defined as the use of technological devices, including online platforms, hybrid juries, and asynchronous ensemble projects, first appeared as a solution to the crisis during the pandemic and the ongoing war. Nevertheless, such emergency actions have transformed into a structural reorganization of pedagogic, institutional, and academic culture. This is consistent with the literature on the digital adaptation of higher education, which is often reactive in the initial phase but eventually becomes structural in the case of sound policy frameworks and pedagogical innovation (Imbesi et al., 2023; Rexhepi et al., 2024).

One of the major themes of this change is resilience, both institutional and pedagogical. In this case, resilience does not simply mean the ability to bounce back after being disrupted, but the ability to rethink the way of teaching and performing when it is continually uncertain. Ukrainian conservatoires were flexible enough to introduce blended models that maintained artistic discipline and embraced digital technology. These models are based on the principles of activity theory, according to which learning systems are in motion and develop dynamically based on the mediation between tools, community, and goals (Engeström, 1987). The technologies embraced, in this case, learning management systems, virtual performance platforms, and asynchronous recording tools, were not substitutes for artistry but mediators that made the continuity of musical expression possible in the face of crisis.

Moreover, the discussion places Ukraine's experience in the context of the global discourse on digital pedagogy. In Europe, Asia, and North America, the pandemic undermined similar institutions, but performance-based disciplines, such as music, dance, and theatre, were disproportionately affected by the need to rely on embodied learning (Kiv et al., 2023). The Ukrainian example lends some twist to this discussion by demonstrating how

performance can co-exist with digital mediation when redesigned assessment, collaboration, and mentorship can be achieved. An example of this hybrid jury system is in the Sibelius Academy in Finland, and the online masterclasses at the Juilliard School, but the Ukrainian modification is unique in its appearance in war conditions, which made the need to stay digitally literate a question of life or death for the institution.

The other aspect of this change is policy-driven innovation. Institutional changes, accreditation criteria, and international cooperation frameworks were all factors that led to the increased use of digital practices starting to become normal in Ukrainian conservatoires (Siliutina et al., 2024). By including digital capacity in governance and quality assurance, Ukrainian policymakers unwittingly provided an example of a prototype of crisis-resilient higher education. This is in line with the demand of UNESCO (2023) to transform digitally as a pillar of educational resilience in post-conflict and resource-starved environments. Therefore, Ukraine is an example of how external shocks, in combination with reform-oriented policy, can lead to long-term systemic modernization.

However, there are contradictions in this transformation. The persistence of digital inequities, cultural resistance within the faculty, and disproportionate infrastructure growth indicate that the digital turn is both an enabling and exclusionary phenomenon. While elite institutions have had opportunities to leverage international collaborations, conservatories in various regions depended on improvisation and local invention. These inequalities align with the digital divide discussions observed in education worldwide, as rapid technology consumption exacerbates existing disparities (Londar & Pietsch, 2023). Such unfairness cannot be addressed solely through technological investment; it also requires cultural repositioning, where digital proficiency becomes an integral part of artistic professionalism rather than a peripheral aspect.

On a more secluded domain, the results challenge the dualism of the so-called traditional and digital pedagogies. The embodied nature of music education has not been diminished by the integration of virtual performance, collaborative recording, and online mentorship; it has also expanded into different aspects of co-presence. This is reminiscent of the new theory of phygital learning, which combines physical and digital experiences to increase authenticity and accessibility in creative fields (Malaschenko et al., 2020). Ukrainian institutions thus demonstrate a transition from the concept of technology as a replacement for physical involvement to technology as an open door to further creative practice.

Overall, the discussion has shown that the higher music education system in Ukraine has not been modernized on a linear basis; rather, it has experienced a multi-layered change that includes pedagogy, equity, and governance. This experiment explores how cultural institutions can transform themselves without losing their artistic meaning through their traditions. The Ukrainian situation confirms a general rule, namely, that technological tools are not the only key to sustainable digitalization of arts teaching, but also a unified vision, empowerment of the faculty, and an imago pedagogical.

6. CONCLUSION AND RECOMMENDATIONS

The digital transformation of higher music education in Ukraine is one of the fastest and most significant educational reforms in European history. What started as a response to intersecting crises, namely the COVID-19 pandemic, displacement due to war, and institutional turmoil, has resulted in a fundamental redefinition of pedagogy, the state, and artistic identity. Empirical studies demonstrate that Ukrainian conservatories have shifted their focus toward new hybrid forms of mentorship, which combine online theoretical learning, asynchronous ensemble practice, and performance assessment through digital media. These changes not only signify a move toward adaptation but also mark the beginning of a new paradigm where technology serves as a creative enabler rather than a limiting factor.

Three outcomes are intertwined in this transformation.

- Pedagogical modernization has rearranged the process of transmitting musical knowledge with a focus on flexibility, student autonomy, and digital competence. Ukrainian institutions have upheld artistic quality and increased accessibility and inclusivity using a combination of online and in-person aspects.
- Second, institutional resilience has become a characteristic of this shift. The capability to maintain conditions of war, migration, and resource scarcity is an example of a transition in crisis management to structural innovation.
- Third, systemic reform has increased through policy alignment and internationalization. Currently, with new accreditation structures and international collaborations, institutions of higher music in Ukraine have become integrated into a larger trend of digitally networked higher education.

However, this shift is still incomplete. Long-existing inequalities in accessibility and infrastructure still separate urban and rural students. Senior faculty members are resistant to new technologies due to culture, and a lack of funding puts the viability of new practices at risk. The lack of specific efforts can make these challenges institutionalize a difference between well-linked conservatories and under-resourced institutions. The digital turn in Ukraine is thus sustainable as it is possible to reconcile technological progress with the equity of pedagogy and the continuity of culture. Based on these observations, several recommendations are presented.

6.1. Invest in a Fair Online Infrastructure

Governments and other global donors should place more emphasis on stable Internet connections, digital laboratories, and technology that is instrument-friendly in all conservatories. There must be equality of access to avoid a two-tier system of innovation.

6.2. Combination Models of Performance and Evaluation are Included

Blended jury systems, combining live and recorded elements, should be codified in institutions to make it possible to maintain academic integrity and flexibility in times of disruption. Post-crisis education systems can use such models as benchmarks.

6.3. Systematizing Digital Pedagogy Training

Professional development programs for faculty are important. Digital tools, media literacy, and online mentorship training can help resolve generational disparities and dispel the idea of innovation in performance-based education.

6.4. Enhancing Transnational Collaboration

Exchange programs, collaborative masterclasses, and joint research activities can be encouraged through strategic alliances with European and North American music schools. Such partnerships raise academic standards and keep Ukrainian music education recognized worldwide.

6.5. Majorities' Resilience in Governance Systems

Policy reform should inculcate flexibility in crises in institutional planning and continuity of learning during political, health, or environmental crises. It will involve cross-sectoral coordination among ministries, cultural organizations, and international partners.

More generally, the transformation of Ukraine teaches a lesson that can be generalized and applied to other countries and their cultural spheres: digitalization in art should not be a case of emergency substitution but a source of creative revival. The tradition and innovation that existed simultaneously in Ukrainian conservatoires testify to the fact that even technological change, directed by policy and pedagogy, may not weaken but rather enhance cultural heritage. The Ukrainian experience can therefore add to the world discussion of sustainable digital education, offering

a viewpoint on how reconstruction after the crisis should be done so that it incorporates innovation and preserves artistic value at the same time. In summary, the development of higher music education in Ukraine is not the goal but a step towards a more inclusive, resilient, and globally connected system. The second reform agenda ought to be aimed at inculcating digital literacy as a core subject in the curriculum, developing change agents in the faculty, and institutionalizing crisis-driven improvisation. With the physical and digital learning spheres becoming increasingly unclear, conservatoires in Ukraine have a chance not only to come back to life but also to set an example, which can be attributed to the perennial innovative spirit that prevails even in the most challenging periods.

7. LIMITATIONS AND FUTURE RESEARCH OF THE STUDY

Despite the fact that this study presents an in-depth discussion of the digitalization of higher music education in Ukraine, there are a number of drawbacks that must be recognized. The study is mostly based on institutional and participant data from a limited number of conservatoires, such as Bogdan Khmelnytsky Melitopol State Pedagogical University, which might not always reflect all the differences of all regional conservatoires. Furthermore, the unstable wartime situation did not allow the longitudinal collection of data to examine the long-term consequences of digital reforms. Although it was a rich mixed-method design, providing a detailed narrative and context, it also had limitations in measuring pedagogical efficacy and in comparing learning outcomes across modalities. Further studies must consequently assume multi-institutional longitudinal models, which incorporate comparative studies between Ukrainian and international music schools. It is also possible to consider the cognitive, emotional, and aesthetic aspects of digital performance learning, particularly since technologies like AI-assisted composition and virtual reality systems are starting to enter the sphere of higher education. Further expansion of this study could be useful in theorizing an international model of resilient, digitally mediated, and culturally based music pedagogies.

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