

THE USE OF DIGITAL TECHNOLOGIES IN MUSIC EDUCATION: PROBLEMS AND PROSPECTS

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Abstract

This article analyzes the role of digital technologies in music education, their pedagogical potential, and their practical application. The experience of teaching Uzbek national musical heritage through digital tools is considered, and practical recommendations are offered to music teachers on the basis of modern software, online platforms, and multimedia resources. The study is based on the experience of the Department of Music Theory at Kokand State University.

Keywords: Digital technologies, music education, DAW, multimedia, shashmaqom, online education, music pedagogy, interactive learning.

Introduction

In the twenty-first century, the education system is undergoing fundamental changes. The rapid development of information and communication technologies has created opportunities for the substantial renewal of music education, as it has for all other academic fields. The digital revolution has transformed not only the ways in which music is performed and distributed, but also the ways in which it is taught and learned. Today's students belong to Generation Z, which has grown up in a digital environment; compared with traditional teaching methods, they are more responsive and inclined toward interactive, multimedia-based, and technology-oriented approaches.

Within the framework of the state policy aimed at modernizing education in the Republic of Uzbekistan, music education institutions are also being actively involved in the process of digital transformation. The Digital Uzbekistan strategy for 2022-2026 identifies the broad use of information technologies in higher education institutions as a priority task. This situation requires music teachers to develop new competencies and adopt new pedagogical approaches.

At the same time, the issue of correctly and effectively transmitting our national musical heritage - in particular, the rich vocal traditions of the Fergana-Tashkent school, shashmaqom, and folk song traditions - in the digital environment stands as a separate pedagogical problem. How can the advantages of the traditional master-apprentice system be harmonized with the possibilities of modern technologies? This article seeks answers to these questions.

ANALYSIS OF LITERATURE AND RESEARCH

The influence of digital technologies on music education has attracted considerable interest among international researchers. Webster (2007) studied the possibilities of creative music learning in the digital environment and developed the concept of computer-assisted music learning. Bauer (2014), in his research on music teachers' technological pedagogical content knowledge (TPACK), demonstrated that the effectiveness of technology use largely depends on the teacher's pedagogical preparation.

Among Uzbek researchers, Shodiyev T. (2008), in his work on music education methodology, emphasized the necessity of using modern tools, while Tojiboyeva M. (2015) examined the problems of digitally archiving national vocal art. However, research in this field is still not sufficiently systematic, and practical experiences have not yet been adequately generalized from a scientific perspective. The present article aims to contribute, at least partially, to filling this gap.

In international practice, several basic models for the use of digital technologies in music education have already taken shape: the Finnish experience of introducing iPads and the GarageBand application into music lessons (Ojala, 2017); the South Korean platform for teaching national musical instruments through digital simulation; and the Indian experience of transferring the guru-shishya master-apprentice system into an online format. These experiences can serve as valuable methodological sources for application in our national context.

OPPORTUNITIES OF DIGITAL TECHNOLOGIES IN MUSIC EDUCATION

Modern digital technologies open up new opportunities in music education in several important directions.

The first direction is the use of tools for recording and analyzing music. DAW (Digital Audio Workstation) programs - Audacity, GarageBand, FL Studio, and Ableton Live

- allow students to record, listen to, and analyze their own performance. This develops self-assessment skills and helps students hear themselves more objectively rather than subjectively in the absence of the teacher. Programs that display the sound spectrum, such as Praat and Melodyne, make it possible to conduct precise intonation analysis in vocal pedagogy.

The second direction is notation and composition software. Programs such as Finale, Sibelius, and MuseScore are of particular importance as visual and interactive support tools in learning music theory. A student can immediately hear the notation they have written, identify errors, and correct them. This ensures a considerably more effective learning process than traditional notation dictations and rewriting exercises.

The third direction is online education platforms. Online music education formats tested globally during the COVID-19 pandemic, such as Zoom, Google Meet, and Moodle, are still widely used as supplementary learning tools. The wealth available on Spotify, YouTube, and local music platforms for Uzbek national music - archival recordings of master singers, maqom performances, and examples of traditional performance - should be regarded as informal sources that need to be actively incorporated into the educational process.

The fourth direction is virtual and augmented reality (VR/AR) technologies. Although this direction has not yet been widely introduced in Uzbekistan, international experience shows that such technologies have significant prospects in simulating musical instruments and stage performance.

TEACHING NATIONAL MUSICAL HERITAGE IN THE DIGITAL ENVIRONMENT

Teaching Uzbek national musical heritage - shashmaqom, yalla, lapar, and dastan genres - through digital tools requires a specific methodological approach. Two risks are present here: first, relying excessively on technology and losing the spirit of live mentorship; second, completely avoiding technology and separating students from the digital environment in which they live and operate every day.

To find a balance between these two extremes, the following hybrid model is proposed: traditional mentorship, based on learning by direct listening, imitation, and live performance, remains the principal method, while digital technologies serve as supplementary tools for consolidation, archiving, and self-analysis. For example, viewing a maqom phrase heard from the teacher in the Praat program, analyzing a

recorded performance in Audacity, and notating it in MuseScore deepen live instruction without replacing it.

Observations conducted at Kokand State University show that students who recorded and listened to their own performances progressed significantly faster in terms of intonation quality and artistic expressiveness than those who did not use this method. In particular, the method of recording and analysis has proved highly effective in mastering melisma and ornamental features in shashmaqom performance.

PROBLEMS AND THEIR SOLUTIONS

In practice, several serious problems are observed in the introduction of digital technologies into music education.

The problem of technical infrastructure is among the most pressing. Not all educational institutions have sufficient internet speed, computers, or specialized software. As a solution to this problem, it is recommended that open-source programs such as Audacity, MuseScore, and LMMS be widely introduced. These programs are free, reliable, and fully suitable for music education.

Another issue is the digital literacy of teachers. Many experienced music teachers face difficulties when using digital tools. Regular professional development courses, peer learning in a master-apprentice format among colleagues, and the introduction of special digital pedagogy modules in higher education institutions can gradually address this problem.

A further problem is the shortage of national content. High-quality digital educational materials on Uzbek national music - annotated maqom recordings, interactive maqom maps, and multimedia textbooks - are still insufficient. In this direction, cooperation between universities, the Ministry of Culture, and private initiatives should be established.

CONCLUSION

The rational use of digital technologies in music education is not only a requirement of modernity, but also a strategic opportunity for transmitting our national musical heritage to the younger generation in an effective and engaging way. Our experience shows that the integration of digital tools with traditional mentorship methods accelerates students' musical development, strengthens their creative initiative, and increases their interest in national heritage.



The experience initiated by the Department of Music Theory at Kokand State University in this direction can serve as a model for other music education institutions in the republic. In the future, the creation of special digital teaching-methodological complexes, the development of interactive platforms dedicated to Uzbek national music, and the establishment of international cooperation should be treated as priority tasks.

As a general conclusion, it should be emphasized that digital technologies are not the goal of music education, but its instrument. The primary goal remains the same: to educate a person who perceives beauty, remains faithful to national heritage, thinks creatively, and possesses spiritual richness. Digital tools reveal their true value only when they serve this goal.

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