

**THE ROLE OF DIGITAL TECHNOLOGIES IN TEACHING THE ART OF MAQOM
TO THE YOUNG GENERATION: AN ANALYSIS OF OPPORTUNITIES AND
PROBLEMS**

Iqbol Toshpulatova

Professor of the Uzbek National Institute of Musical Art

named after Yunus Rajabiy

E-mail: toshpulatova@gmail.com

Abstract

This article critically examines the role of digital technologies in teaching maqom art — a cornerstone of Uzbekistan's national musical heritage — to younger generations. The study analyzes the limitations of traditional pedagogical methods, evaluates the educational potential of digital platforms and multimedia tools, and draws on empirical data from Uzbekistan and international practice to propose a hybrid instructional model.

Key words

maqom art, digital educational technologies, national musical heritage, music pedagogy, e-learning, Uzbekistan.

Maqom is a centuries-old musical and philosophical heritage of Uzbekistan and Central Asia, which was included in the UNESCO List of the Intangible Cultural Heritage of Humanity in 2003 [1, 14-p]. This recognition, on the one hand, confirms the global value of the art of maqom, and on the other hand, sharply increases the responsibility for its transmission to future generations. However, modern globalization processes, the rapid spread of digital culture and the decline in interest in national music among young people pose a serious threat to traditional maqom education [2, 87-p].

The Law of the Republic of Uzbekistan “On Culture” (2019) and the “Concept of Development of the Republic of Uzbekistan until 2030” define the preservation of national cultural heritage and its transmission to young people as a priority task [3, 5-p]. In this context, the modernization of maqom education and the strategic use of digital tools are becoming not only a pedagogical but also a state policy issue.

The trend towards digitization of intangible cultural heritage and teaching through digital tools is also gaining momentum worldwide. According to UNESCO’s 2022 report, special digital education platforms have been developed for more than 300 intangible heritage elements worldwide [4, 22-p]. In Uzbekistan, however, this direction is still at the stage of formation and requires systematic scientific analysis - this is what determines the main relevance of this study.

Traditional maqom education has been based on the “teacher-student” system for centuries, and this model, despite its unique positive aspects, contains a number of systemic problems. First, the oral-practical nature of knowledge transmission limits it geographically: if the student is outside the city or even the neighborhood where the teacher lives, the opportunity to receive quality education is sharply reduced [5, 134-p].

Second, the size of the maqom repertoire is enormous - Shashmaqom alone consists of more than 250 melodies and more than 360 poetic texts [6, 48-p]. Many years of regular practice are necessary to memorize and internalize them. In the traditional system, the student's progress is not recorded, as a result, progress may not be objectively assessed.

Third, the aging of teachers in the field poses a serious threat. According to the Uzbek State Institute of Arts and Culture, the average age of teachers actively teaching maqom in 2023 was 63 years old [7, 12-p]. This figure indicates the weakness of the system in terms of human resources. At the same time, it would be wrong to deny the advantages of the traditional system. A skilled teacher conveys to the student not only the note or rhythm, but also the philosophy of the maqom, its spiritual content and subtle secrets of performance. As academician and ethnomusicologist F. Karomatov noted, maqom can be learned not from paper and writing, but only from a living voice [8, 91-p]. This paradox also determines the limits of the application of digital technologies.

Digital audio and video recordings occupy a leading position in maqom education. Today, there are more than 45,000 videos on the “Uzbek maqom” on the YouTube platform, most of which are posted by practicing musicians [9]. However, the quality and pedagogical value of this content have not been verified: most videos do not explain the performance technique, do not provide musical notation, or use incorrect terminology.

The Living Archive system developed in Japan for intangible heritage provides an example of an approach that can be applied to maqom education: in this system, performance videos are synchronized with interactive notation for each section, and the student can pause, re-listen, and visually analyze them [10, p. 67].

Although applications designed for music education — Yousician, Simply Piano, Musicca — are based on Western music, their interactive exercises and instant feedback mechanisms can serve as methodological models for maqom education platforms. In particular, pitch recognition systems based on Artificial Intelligence (AI) allow students to evaluate their performance in real time and indicate errors [11, p. 203].

Initial attempts in this direction have begun in Uzbekistan. The State Conservatory of Uzbekistan developed a prototype of the “Shashmaqom” mobile application in 2021. The application allows you to visualize maqom passages and learn basic rhythmic structures [12, 18-p]. However, the project was not fully developed due to financial and technical constraints — a problem widespread in the field of digital music education in Uzbekistan. The COVID-19 pandemic (2020-2021) also caused a forced digital transformation in maqom education. According to the Institute of Arts and Culture of Uzbekistan, the transfer of 78 percent of music lessons to an online format in the spring of 2020 demonstrated the low technological readiness in this field [13, 4-p]. However, online maqom lessons also created their own pedagogical problems. For example, audio latency in the Internet connection made ensemble training almost impossible. In an experiment conducted by American researcher J. Dunn, the accuracy of time and rhythm in online music lessons was observed to be 40 percent lower [14, 112-p]. This is especially important for maqom, since the most subtle syllabic nuances of rhythm are crucial in maqom. A number of international experiences in the field of teaching intangible musical heritage using digital technologies can also be useful for Uzbekistan.

In India, the “e-Guru” platform was developed to digitize classical Hindustani music (raga) education. The platform consists of a digital library containing more than 500 ragas,

interactive exercises and a certification system. According to the results of the 2022 assessment, 71 percent of platform users use it to fill in the gaps in traditional lessons [15, 89-p].

In Iran, Azerbaijan and Turkey, the traditions of “radif” and “mugam”, which are close to maqom, are also included in the digitization process. Since 2019, the Ozarbayan State Mugam Center has been implementing a special project called “Digital Mugam”: more than 1,200 audio and video recordings have been digitized, and 85 textbooks and pedagogical guides have been published in online format [16, 33-p]. This experience shows that combining digital archiving and educational functions on one platform is the optimal approach.

South Korea occupies a special place in such experiences. Since 2016, the country has been applying artificial intelligence technologies to teaching intangible heritage within the framework of the K-HERITAGE laboratory. In particular, a system has been developed for “gugak” (Korean classical music) using AI to compare a student’s performance with the teacher’s notes and automatically detect errors [17, 56-p]. This approach can also be fully implemented in maqom education.

Internet penetration in Uzbekistan is 78.5 percent as of 2023 [18]. However, this indicator varies significantly by region: Tashkent city — 96 percent, Surkhandarya region — 54 percent [19, 7-p]. In regions with historically rich traditions of maqom education, such as Fergana, Khorezm, and Bukhara, the lack of high-speed Internet prevents digital education from being equally accessible to the population. This situation poses a serious threat to the equity principle in the introduction of digital technologies into maqom education.

The most important aspect of maqom performance — the technique of "editing" (improvisation and decoration) — is difficult to convey in a standardized digital format. According to academic researcher N. Rahimova, microtonal aspects of maqom performance (such as 3/4 tone, quarter tone) are not fully reflected in the traditional European notation system, nor in most digital musical instruments [20, 77-p]. This technical limitation poses the risk of superficial teaching of maqom in digital educational systems.

According to a survey conducted in music education institutions in Uzbekistan, only 23% of teachers teaching maqom reported that they could independently use digital teaching tools; 61% admitted that they needed special training [21, 9-p]. This data indicates that the introduction of digital technologies is primarily related to the human factor, not the technical one.

Digital platforms, especially social networks, often encourage maqom content to adapt to the requirements of their algorithms - promoting shorter, more entertaining, "viral" formats. This contradicts the deeply philosophical and artistic nature of maqom. For example, 83 percent of videos posted under the “maqom” tag on TikTok used maqom as a decorative backdrop, but did not reflect its true performance tradition [22].

The analysis presented above shows that it is wrong to either accept digital technologies as a “cure-all” or completely reject them in maqom education. As an alternative approach, a “hybrid model” is proposed — this model assumes that the core of the traditional teacher-student methodology is preserved, while digital tools are integrated into it as additional tools.

The first recommendation is to create a national digital maqom education platform. This platform should include the following components: (1) an annotated audio-video archive prepared by professional writers; (2) a microtonal notation system adapted to maqom; (3) interactive exercises and SI-based assessment; (4) the possibility of synchronous and

asynchronous communication with teachers; (5) an online community that brings together regional and diaspora students [23, 44-p].

The second recommendation is to introduce a mandatory digital literacy training program for teachers of maqom education. In world practice, it is recommended that training on digital tools in music pedagogy should not be less than 80 hours [24, 31-p]. Such a standard has not yet been established in Uzbekistan. The third recommendation is to introduce a public-private partnership (PPP) model. Large IT companies — Humans, Click, Payme, etc. — can be involved in cultural heritage digitization projects as part of their corporate social responsibility. China's experience in this area is of significant practical importance: the country's government and technology companies have jointly created more than 50 educational platforms for intangible heritage [25, 19-p]. Digital technologies are an important opportunity, but not a necessity, in teaching the art of maqom to the younger generation. They cannot completely replace traditional education — the spiritual and aesthetic essence of maqom still requires living, listening, and communicating with a teacher. At the same time, the systematic, pedagogically sound use of digital tools allows: to overcome geographical limitations; to encourage students to practice independently; to archive the heritage and pass it on to future generations; to promote maqom internationally. However, in order to realize these opportunities, it is necessary to solve a number of systemic problems in Uzbekistan: eliminating the territorial inequality of digital infrastructure; retraining pedagogical personnel; developing special digital tools suitable for the aesthetics of maqom; increasing strategic investments at the state level. In the future, as a continuation of the research, it is recommended to test the practical application of SI in maqom education, implement pilot projects based on a hybrid model and empirically evaluate their effectiveness. After all, the future of maqom lies not only in remaining faithful to tradition, but also in the ability to combine tradition with modern opportunities.

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