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Music computer technologies as a worth-while means of folklore studying, preserving and transmission

Las tecnologías de la computadora musical como un medio valioso de estudio, conservación y transmisión del folclore

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ABSTRACT

With the modern threat of extinction of samples of traditional musical culture in various regions of the world, the problem of saving folklore is becoming particularly important. The Far East is a unique ethnic region where representatives of entirely different traditional cultures live. The authors use the Far East of Russia and China as an example in their study. The researchers introduce information and music computer technologies (MCT) as the means of the problem solution. Nowadays, the musicians admit the viability of MCT as the means of musical culture research, transmission, and preserving.

Keywords: Far East, folklore, musical culture, music computer technologies.

RESUMEN

Con la amenaza moderna de extinción de muestras de la cultura musical tradicional en varias regiones del mundo, el problema de salvar el folklore se está volviendo particularmente importante. El Lejano Oriente es una región étnica única donde viven representantes de culturas tradicionales completamente diferentes. Los autores utilizan el Lejano Oriente de Rusia y China como ejemplo en su estudio. Los investigadores introducen tecnologías informáticas de música e información (MCT) como el medio de la solución del problema. Hoy en día, los músicos admiten la viabilidad de MCT como medio de investigación, transmisión y preservación de la cultura musical.

Palabras clave: cultura musical, folklore, Lejano Oriente, tecnologías informáticas musicales.

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1. INTRODUCTION

Since the second half of the 20th century, the saving of the world's cultural and natural heritage has become one of the priority tasks for the world community. National and international organizations only began to recognize the value of the intangible cultural heritage and the responsibility for its saving at the turn of the past and the present centuries. As a result of numerous seminars, conferences, and forums, the Convention for the Safeguarding of the Intangible Cultural Heritage was developed and adopted by UNESCO on October 17, 2003.

One of its most complex components includes issues related to the saving of musical art of the oral tradition in the whole variety of genres, musical instruments, tone and pitch systems, performing techniques, and other cases of the typical and characteristic features of each ethnic group.

Today traditional musical culture can hardly resist globalization. Modern technologies and means of communication bring various audiovisual products to the most distant corners, blur the line, and change the phonosphere - namely, the sound environment of humans and society. There is both unification and mixing of different cultures. Recognizable clichés of traditional music penetrate popular musical genres and mix bizarrely with other cultural elements. They are widely replicated and returned to the bearer of traditional intonations in a mutilate sound, which leads to the risk of an ethnophore hearing shift. The availability and distribution of keyboard instruments, including electronic ones, with an even-tempered scale, as well as the use of loudspeaker equipment only, make things worse. Features of national music-making and peculiarities of authentic cultures may be irretrievably lost. The musical art of the oral tradition based on ethnological hearing is a vulnerable component of the cultural environment. Special efforts are required to save this uniqueness for future generations.

Special expeditions work all over the world to collect samples of traditional musical art, its digitization, and systematization. *The concept for the Preservation and Development of the Intangible Cultural Heritage of the Peoples of the Russian Federation for 2009-2015* (UNESCO: 2003) provided the development, formation, and administration of the electronic catalog, which was based on the questionnaire - namely, a passport of an intangible heritage object. The passport includes the following information about the object, such as annotation, description, research, documentation, review, notes, and digital display (graphics, photo, sound, and video). The certification of traditional musical art samples implies their authenticity and the highest possible preservation for future generations. However, if the intangible cultural heritage is used as a factor of a nation or ethnic group consolidation, then such preservation and reliability are not necessary. Even the recognizable features of these samples evoke historical memory, being a symbol, a reference to the common national or ethnic sources (its structure, language, etc.) either based on previous experience or experimental exposure (Thorpe et al.: 2012, pp.428–470).

The methodological study of traditional musical cultures is based on the ideas that reveal the research matter. In this context, the works of Asafieva and Zemtsovsky (Asafiev: 1973; Zemtsovsky: 2005, pp.181-192) and other researchers are important. In the Russian pedagogical system, the development of music perception is interpreted as the basis for the formation of the students' musical culture. According to Kabalevsky, "perception is the basis of musical art in all its manifestations: in creativity, performance, hearing, and, of course, in its study" (Kabalevsky: 2005). In this context, valuable methods have been developed related to the creation of proper images and emotions through speech, gestures, repeated listening, vocalization, and playing musical instruments (Asafiev, 1973). However, we can talk about the inverse relationship. It is known that the activity generates perception (Galperin: 2011, pp.167-182; Vygotsky: 2017, pp.4-22). Musical perception develops most effectively in the process of productive musical activities. The researchers determine the realization of interrelation possibilities as the main task in the framework of contemporary music education.

The works devoted to the analysis of the influence of MCT on contemporary musical culture and education are important for this study. The work of the Educational - Methodical Laboratory "Music and Computer

Technology" of the Herzen State Pedagogical University of Russia, conducted under the direction of Gorbunova, is particularly important in the issue. The researchers developed the concept of inclusive musical education (Gorbunova & Govorova: 2018; Gorbunova & Voronov: 2018, pp.15-19); the issues of informatization of modern music education; interactive network technology for teaching (Gorbunova & Goncharova: 2016; Gorbunova & Hiner: 2019). In addition, they studied musical culture of modern society in the context of the transformations and sociocultural discourses; developed a sophisticated model of the musical semantic environment (Gorbunova & Zalivadny: 2018, pp.55-64), and MCT based modeling of creative processes (Gorbunova & Chibirev: 2019)).

In this aspect, the study of the national folklore transmission and preserving is conducted on the example of the Far East (Bulgakova: 2015, pp.227-236; Bulgakova: 2013; Petrova & Parnyakov, pp.133-139; Yakovleva & Yakovlev: 2014, pp.75-80). The traditional culture of the Far Eastern region of Russia and China presents an extensive pattern of cultural heritage. Intonationally rich region attracts the attention of music researchers. The musical culture of China is aged several millennia and has deep-rooted traditions and original roots. The musical culture of China was influenced by neighboring cultures. Besides, it was enriched by the music of the nations that were part of the Chinese state (the Uigurs, the Tibetans, the Mongols, the Jurchen, the Manchu, etc.) (Wang: 2010; Wang: 2018). Chinese culture influenced the musical culture of Korea, Japan, and some nations of Southeast Asia and the Pacific (Sun & Quan: 2005; Tian: 2018; Yuan: 1977, pp.20–26). Since ancient times, religious, philosophical, and ideological ideas have contributed to the development of Chinese music. The cosmological concept of the nature of music played a particular part, and its social and political role was also important.

2. METHODS

Research methods: Culturological analysis of the research problem allows us to consider the object of study in a broad interdisciplinary context. This predetermines the methodological essence of the study, the necessity to apply a number of modern methods of cultural research, the implementation of the methods, and achievements of related sciences (first of all, the authors appealed to cultural studies, art history, musicology, ethnomusicology, enology, ethnography, and other sciences).

Research tasks are:

- to develop new methods for systematization of individual structures that eluded traditional musical analysis, to generalize them while preserving individuality,
- to identify the role of MCT in music education, composing, as well as in the development, transmission, and preserving of traditional musical culture.

Research issues:

The authors studied the development of modern information technologies, including MCT, for the creation of new opportunities in the sphere of collecting and fixing materials, saving folklore, funds, and transmission.

The purpose of the research is to develop a new approach to the studying, transmission, and preserving national folklore with the help of MCT.

The authors study the materials, approaches, and methods of MCT implementation as a worth-while tool of research, transmission, and preserving the national folklore in the context of the application of modern technologies in the Chinese system of music education. It is a well-known fact that the Chinese are eager for education. To support this trend, the state began to change the structure of education systematically – namely, to transfer it from the so-called elite, not available to everyone, to the masses, designed for all social groups.

This opportunity appeared due to the rapid development of computer technology in China, which started in the 1990s. The digitalization of education and the development of the internet contributed to fundamentally

new forms of learning. Today we can talk about the revolution in the sphere of Chinese training and education, including music. The main emphasis is on multimedia technologies that allow combining and varying all forms of information – namely, graphics, audio, and video, as well as animation.

The implementation of the multimedia principle provided the development of a variety of interactive online teaching technologies. That improved the effectiveness of education. In the conditions of the largest country in the world with rapid development, these technologies provided opportunities for studying for a considerable number of people interested in it. As a result, people's cultural level improved (Yuan: 1977, pp.20–26). Particularly impressive success was achieved in the sphere of solfeggio, which much attention is paid to in China (Lin: 2016; Lin: 2011; Peng: 2007).

In 2002, the Second National Conference, specifically devoted to digital musical education, was held in Yantai, Shandong Province (STN - Sharing Teaching Network).

The Second National Conference on digital musical education was held in Yantai, Shandong Province (STN - Sharing Teaching Network) in 2002. It was organized by the Association for Digital Musical Education and the Association of Chinese Musicians. Among the participants were the Central Music Conservatory, the Nanjing Academy of Arts, and ten music colleges. It was declared the beginning of the era of digital solfeggio in China (Zhao: 2002, pp.23-28).

Internet access makes multimedia possibilities limitless. The following aspects are distinguished in music education:

1) MCT materials (textbooks and teaching aids);
2) Software for testing and evaluating musical abilities;
3) Distance online learning;
4) Digital music production (as educational material);
5) Research and projects on MCT introduction and implementation in the educational system.

The authors analyze each of these aspects briefly (Martins et al.: 2019).

Digital Chinese textbooks can be electronic and "mixed". Solfeggio collections containing hyperlinks are trendy among the students. It is enough to point the mobile phone with the recognition program at the QR code, and the student will have the opportunity to hear a voice, organ, ensemble, or even an entire orchestra!

MCT-software as a tool for testing musical abilities is widely used throughout the world (mainly in the sphere of popular music and among music fans). However, in China, similar programs began to be applied for art colleges' entrance exams. In the Xinghai Conservatory of Music (Shanghai), interactive software is used as an express learning method (Golestani & Fallah: 2019).

It is difficult to overestimate the possibilities and advantages of distance learning. Thus, in China in 1999, with the support of Zhongyin Company, the Institute of Contemporary Distance Music of the Central Music Conservatory was officially established. Its goal was learning through the Internet, with the certificates and diplomas issuance (the so-called "fixed point consulting method"), as well as the distribution of the necessary materials (to avoid insufficient global network bandwidth and just for the users' convenience). The advantages of distance online learning can be understood not only by the students, but also by the professors, who receive the opportunity to share their experiences over the whole world.

Zhongyin Company was founded in the Electronic Music Laboratory of the Central Music Conservatory. For the past nine years, she has become a leader in the scope of digital music - namely, in the sphere of professional digital instruments and professional digital sound. The main goal is to promote China's electronic music industry. Zhongyin's product is a valuable tool in the framework of MCT-music education (Jiang: 2007).

Numerous researches and projects for the introduction and implementation of MCT in the Chinese educational system are devoted to the digitalization and accessibility of knowledge. The improvement of the scientific and artistic information is based on the high speed of knowledge sharing. As a result, it helps people to create a single platform for the communication of any kind.

3. RESULTS

Scientists of different scientific spheres have studied the history of the interaction of eastern and western musical civilizations for a long time. Shakhnazarova distinguishes three stages of musical interdependence.

> The first stage is marked by the impact of a highly developed culture of the East on European music during its initiation. On the second stage, which starts in the Middle Ages, the East is gradually rejected, the further the more categorically, to the periphery of musical civilization. From this moment, Eurocentric criteria of culture and art are formed and asserted. That is a concept according to which the principles of the aesthetic perception of the environment and art in particular (thinking system, style, and formative norms, beauty canons, etc.), that were crystallized in the European masters' creations, are regarded as objective laws of art in general. The third stage (approximately from the end of the 19 century) can be considered as a reprise. The East is once again entering the consciousness of European musicians that appeal to it with hope and expectation of renewal. (Alkon: 2002)

Koroleva introduces three stages of Chinese music perception, which correspond to the following positions:

> 1) The second half of the 19th century until the first third of the 20th century. Both untrained and trained listeners experience a stunning effect, leading to active rejection and unwillingness to continue contact perception;
> 2) The second half of the 19th century until the first third of the 20th century. Both unprepared and trained listeners rarely experience confusion, gradually turning into some interest, leading to further understanding of the simplest elements of a musical language (timbre, melody, and rhythm);
> 3) The beginning of the 21st century. The professional interest of some (single) specialists, orientalists, and musicians, in the performance of music of a foreign cultural tradition (Koroleva: 2011, pp.171-182).

It is known that a misunderstanding of the Chinese music essence led to its rejection even by famous European musicians. The gradual formation and development of the Chinese composing school were based on the European compositional technology, relying on rich traditional musical art. The specific character of the music of Chinese composers is expressed with the synthesis of Chinese national melodics and the principles of West European harmonization and compositional techniques, as well as by the gradual combination of European and Chinese traditional intonation, although the intonation of Chinese composers' works is based on Chinese folk melodics that draws upon on pentatonicism. Professional composing art is characterized by the following features: the predominance of the images of nature, reliance on Chinese folk melody, West European harmonization and principles of composition, the understanding of traditional musical art through the musical creativity of Western European, Russian and Soviet musicians. The inverse influence of the East on the classical western musical tradition is much weaker. In this context, we can appeal to the works *Das Lied von der Erde (The Song of the Earth)* by Mahler; *Music of Change*, *Water Music*, and *Winter Music* by Cage; musical compositions by Cherepnin and some others (Gál-Szabó & Bede-Fazekas: 2020).

One of the issues of ethnomusicology is the saving and study of the musical culture interrelations. After the revolution, ethnographers, cultural historians, and folklorists showed a great interest in studying the art of the indigenous population of Siberia and the Far East of Russia. During this period, the article by Steshenko-Kuftina (Steshenko-Kuftina: 1930, pp.81-108) was especially valuable for ethnological knowledge. In this work, the author analyzes Nivkh and Udege songs, aboriginal musical instruments. In addition, problems of musical

instruments and the style of folk songs have reveled in the article. The value of Steshenko-Kuftina's article is in focusing on interethnic relations. She writes the following:

> The closeness of China, especially the direct trade relations between China and Japan, which exist among the Udehe and some of the Gilyaks, do not have in this case the influences that could have been supposed. Except for the single-stringed bow instrument "tyi(ng)g(rng)", with a cylindrical birch bark body and fish-skin deck, which is rarely found among the Gilyaks (Sakhalin), almost nothing has been taken of the Chinese instruments.

Indeed, we could suggest much closer cultural contacts, as the trade relations of the Far East were quite developed (Talebi & Nejad: 2019, pp.6-14).

At the same time, *the natives of the Russian Far East* have common material and spiritual cultures (Nanai, Negidal, Oroch, Orok, Udege, Ulch, Evenks, Evens, Nivkh, etc.), since these peoples lived in neighboring territories, led in many respects an identical way of life and had a similar worldview. Close contacts of the natives led to a synthesis of cultures, ethno-and cultural genesis. At an early stage, their art represented the so-called "primitive realism". Folk art more or less reflected various aspects of the surrounding reality, lifestyle, and human worldview. The perception of the environment of the indigenous peoples of the Russian Far East took on a different aspect in the musical folklore. The traditional vision of the surrounding reality, animistic perception, everyday life, and culture peculiarities were reflected in songs, musical instruments, tunes, and rituals.

The works of professional composers and other musicians represent an invaluable source of ethnic musical materials of the Russian Far East. They contributed to the saving and revival of the national musical heritage. Their musical compositions were based on the characteristic modal, metro-rhythmic, and textural patterns of Far Eastern music, introducing a different aspect of the intonational features of indigenous folklore. This contributed to the original synthesis of traditional and European intonation cultures. In this context, the works of Mentzer is particularly valuable as he implemented not only direct quotes from songs and instrumental tunes of the natives but also the method of re-intonation (Leskova: 2016).

The authors of the article designed electronic university textbooks on the theory of music, information technology in music, and the MCT (in the moodle.herzen.spb.ru system), that is accessible for the Chinese students (Alieva & Gorbunova: 2019, pp.140-149). Multimedia textbooks allow not only working with students online but also constantly changing, supplementing, and improving the content. Besides, this made it possible to enrich the teaching material of MCT manuals with folklore materials collected in the early 2000s in the field in the places of residence of the indigenous peoples of the Russian Far East (in the villages of Sikachi-Alyan, Troitskoye, Dzhari, Naihin, Gvasyugi, Daerga, etc.). The sphere of the study included the musical art of the Tungus-Manchu peoples (Nanai, Negidal, Oroch, Orok, Udege, Ulch, Evenks, and Evens). The authors conducted the comparative analysis of vocal recordings, instrumental and vocal-instrumental samples of musical folklore of the indigenous peoples of the Paleo-Asian group of the Far East (Itelmens, Nivkhs, Koryaks, etc.).

The consolidation of society contributes to the adaptation of musical patterns to current conditions. In terms of external compliance with traditions, such a performance may seem to be modernized and intonationally differ from an authentic, traditional one. It reproduces recognizable macrointonations but does not reflect microintonations - namely, intonational nuances of traditional performance that constitute its very essence and artistic and historical value.

Today, traditional musical culture can hardly resist globalization. Modern technologies and means of communication provide the most distant places with a variety of audiovisual products. This changes the phonosphere, the human and social sound environment. The concept of the phonosphere was proposed in the 1980s by Tarakanov (Tarakanov: 2002, pp.158-169). When different cultures unify and mix, the recognizable clichés of traditional music penetrate popular musical genres and mix bizarrely with other cultural

elements. They are then widely replicated and returned to the bearer of traditional intonations in a mutilate sound, which leads to the risk of ethnophore hearing shift. It is necessary to create a "music bank" - namely, a single catalog available for the storage and future use of national musical culture samples (Alieva & Gorbunova: 2016, pp.105-108). Nowadays, the collections and archives designed by musicologists are fragmented and scattered across different countries. Besides, the existing systems for storage and processing of musical information are not intellectual. They are not able to take into account the nebulosity, uncertainty, and partial reliability of musical information nor respond to users' requests in a linguistic form with unclear characteristics.

The important task is to develop new methods that would allow the systematization of individual structures that elude traditional musical analysis and generalize them while maintaining individuality. The category of nebulosity and the models and methods connected to it allows us to conduct a quantitative analysis of the phenomena that could previously be studied only on a qualitative level or that required the use of rough patterns. It is necessary to develop an understanding of the processes that take place in the sphere of ethnomusicological knowledge and create our own methodological base.

Artistic norms of "pure" intonation, a characteristic of traditional performance, form a zone of artistically determined intonation (Bhatara et al.: 2016, pp.1816-1830; Langmeyer et al.: 2012, pp.119–130), which corresponds to the peculiarities of national music and is an essential condition for ethnic hearing preservation (Zemtsovsky: 2005, pp.181-192). The preservation of the "reference sound", or the artistic norms of pure intonation, a characteristic of musical culture, is based on the performers and listeners' collective hearing brought up by previous generations of the ethnic group (Alieva & Gorbunova: 2016, pp.105-108; Asafiev: 1973). The concept of the ethnic hearing was introduced by Zemtsovsky (Zemtsovsky: 2005, pp.181-192) as "intrinsically natural to every person". B.L. Yavorsky considers it to be an internal auditory setting (Yavorsky: 1987, pp.41-235; Yavorsky: 1908). "Reference sound" and ethnic hearing should be of particular concern when dealing with the preservation of the oral tradition of musical art as an intangible cultural heritage.

Traditional musical art is not a museum exhibit. Thus, for cultural heritage, both the preservation of its best examples in catalogs and ethnic hearing preservation is equally important. Preservation of a musical sample when not supported by authentic performance turns it into a souvenir. At a crucial historical moment for an ethnos, such a sample (not necessarily in authentic performance) can revive the national spirit, educate, and unify the society. As a result, the object of traditional musical art turns into a sign and withdraws it from the category of musical phenomena with cultural value, and places it into an ideological category - namely, into a symbol. Adorno analyzed the ideological function of music in society. In his works, he highlights the following aspects: "Music has become a political ideology since the middle of the 19th century. It highlighted national characteristics, introduced a particular nation, and adopted the national principle everywhere" (Adorno: 2014). A decision arises: either to save traditional music as a cultural phenomenon or take advantage of the special status of music - namely, its ideological functions in society.

At the same time, we cannot ignore the fact that the objects of intangible cultural heritage are living organisms, in contrast to monuments of architecture, writing, and painting. Like any living organism, a traditional musical culture develops and evolves. It is important to understand which alien changes do not develop, but destroy the monument of intangible culture, separating it from its source (Hoffer & Bailey: 2016; Quinto et al.: 2014, pp.503–524).

Have a national collective artistic taste and ethnic hearing changed? Has the style of performance and artistic norms of pure intonation changed? These are important and complex problems requiring special studies and comparisons with the materials from earlier folklore expeditions.

MCT plays a special role at every stage of these tasks solution, namely: musical samples recording, their processing, storage, systematization, cataloging, study, comparison, and identification of invariant and variable components.

The interconnection of material, technical, and technological aspects in culture contribute to several problems for modern research. The authors identify the following issues: the possibilities and limits of

technologization in modern culture (Chen: 2007; Gorbunova & Govorova: 2018; Sun: 2018; Yu: 2011), the role of MCT in music education, composing, as well as in the development, transmission and preserving of traditional musical culture. It is known that tradition is the most sustainable part of the culture. It constantly and inevitably interacts with innovations, being enriched with them to a certain extent.

There is no secret that any method of musical folklore fixing introduces distortions into the recorded material. The limited period of use of the media with text, audio, and video recordings make the preservation of already collected materials rather insecure. A lot of valuable materials were recorded on non-durable magnetic tapes (bobbins).

Musical fixation is subjective, and any sound recording technique leads to distortion. Moreover, some folklorists point out that the presence of a researcher and equipment contributes to some psychological pressure on the performers. While performing "to order" or "for recording", the performer does not only change, sometimes unconsciously, his behavior and performance but also make "corrections" to the musical piece. Thus, for example, while decoding Nanai shamanistic rituals, the authors came across an interesting moment. Before the beginning of the ritual, the shaman requested her assistant spirits to forgive her for the process to be recorded on tape. Undoubtedly, such deviations affect the shaman and her "patient," and, consequently, the ritual she conducts. People who are not related to the sphere of ethnographic science can also adjust the materials processing. Thus, one of the authors of this article (Mezentseva) had a sad experience while transferring the rarest sample of the Nanai shamanistic rite from a magnetic tape. The recording specialist simply cut out the "unnecessary" and "empty places" the rite.

It is obvious that the fixation of a folklore piece should present the collected material as precisely as possible. Probably, hidden observation and recording of musical folklore would be an ideal variant (like flora and fauna observation and scientific understanding, the so-called "visual anthropology"). In this context, the point for discussion is not so much technical, but moral and ethical aspects of such a fixation (consent to personal data processing).

One of the Russian cultural policy priorities is to provide the population with maximum accessibility to cultural benefits. The Decree of the President of the Russian Federation *On the Strategy for the Information Society Development in the Russian Federation for 2017–2030* focuses on improving the cultural heritage accessibility for all the Russians, meeting the requirement of the society to get high-quality and reliable information. In addition, it highlights the necessity "to ensure the formation and free access of the National Electronic Library and other state information systems, including objects of the historical, scientific and cultural heritage of the peoples of the Russian Federation" (About the Strategy...: 2017).

The digitalization and saving of the best samples are necessary. In this context, the project presented in the article is unique. The authors focus on the necessity to develop "a musical bank", a kind of unified catalog of samples of the national musical culture, which are currently fragmented and separated. The main goal is to create a single and constantly updated intellectually organized intonation catalog of traditional music samples not only from different regions of Russia but also from different countries. It must be accessible, applicable for musical education, scientific research, and musical art. The purpose of the project is to solve a fundamental scientific problem, which consists in developing a model-building technique, based on the fuzzy analysis.

The development of modern information technology provides new opportunities in the sphere of collecting, fixing materials, saving, and transmitting folklore funds. At the present stage, technological progress allows us to save and transmit (broadcast) priceless endangered samples of aboriginal musical folklore. The most advanced type of sound recording at the moment is digital. The digitized records can be transmitted with no loss of quality. Today, archival library funds are computerized, materials are digitized, electronic catalogs and databases are created. In addition, new methods of folklore collecting and saving are being developed.

Since the middle of the 20th century, electronic musical art has been creating a powerful base of expressive musical means, penetrating not only into the academic genres but also in the sphere of music for theater, cinema, and all kinds of performances. The semantic and morphological properties of musical

compositions created with the help of MCT can be considered as abstract levels of musical culture. They were developed in a high-tech informational, creative sphere - namely, virtual educational and creative cultural environment (Gorbunova & Govorova: 2018; Pejrolo & DeRosa: 2016).

We also point out that, being a cyberculture phenomenon, the idea of virtuality today is regarded in the framework of various genres and styles of music. It is determined by the information technologies application in musical culture and is treated as an artificially created medium. Musical composition elements, as a form of psychological phenomena and experiences substitution, are considered to be a virtualization tool of the musical culture (Alieva & Gorbunova: 2016, pp.105-108; Alieva & Gorbunova: 2019, pp.140-149; Gong: 2018). This statement is valid for various systems of analysis, verification, and musical text creation, containing the information about intonation, which is one of the most important (if not the most important) elements of musical speech. Thus, this predetermines the necessity to create the intonation catalog of world music (Alieva & Gorbunova: 2016, pp.105-108).

With the development of MCT, musicians are able to create high-quality phonograms. Digital filtering and phonogram processing tools (Gorbunova & Voronov: 2018, pp.15-19; Gorbunova: 2018, pp.144-150) provide almost unlimited possibilities for sound elements creation, determined by the artistic and aesthetic needs of folklore bearers and researchers, folk musicians and a more extensive range of professionals and listeners.

In terms of increasingly intensifying processes of different cultures' interaction and interpenetration at the intercontinental, interethnic and interstate levels, modern means of cultural transmission are of particular importance (Langmeyer et al.: 2012, pp.119–130; Sun: 2018). Currently, the possibility to transmit any information online opens up new opportunities for adequate data transmission. It accelerates the "exchange processes" of cultural dialogue. The UNESCO Universal Declaration on Cultural Diversity, adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organization on November, 2, 2001, declares: "The globalization process, stimulated by the rapid development of new information and communication technologies challenges cultural diversity, although, creates the conditions for a new dialogue" (UNESCO: 2003).

Nowadays, the development of a modern computer recording studio, as a tool of musical art and the phenomenon of contemporary musical culture (Gorbunova: 2018, pp.144-150; Gorbunova & Govorova: 2018), contains elements that allow saving the traditions and cultural inheritance mechanisms in the context of historical continuity, cultural values and meanings transmission.

Modern Internet resources provide access to world scientific information. Nowadays, researchers should set new tasks. It is necessary to study opportunities for modern information and communication technologies, the latest MCT for collection, processing, saving, transmission, and broadcasting traditional musical culture. In addition, it is worth clarifying their role in cultural dialogue and intercultural communication.

4. CONCLUSIONS

Unique samples of traditional musical art are being collected around the world; expeditions are working in the field, scientists study, and comprehend the collected materials. Difficult work in musical samples decoding is being conducted. It is important to process and notate the collected material professionally. In addition, it is necessary to catalogize, classify, systematize, and digitalize the materials.

Information technologies and MCT are being applied in all levels of education more and more actively (Leskova: 2016; Lin: 2016; Lin: 2011; UNESCO: 2003). MCT advantages for traditional cultures study and saving in the context of knowledge transfer are being emphasized. *The use of direct links is very promising. They can lead the reader to musical samples of folk culture (the "music bank"), to software resources of MCT-sound processing, saving, and transmission.*

Modern digital technologies and MCT allow organizing the educational environment in the network and providing communication with different participants of the cultural dialogue. The latest information products

are unique tools, necessary not only for the improvement of the modern educational process, but also to push cultural dialogue issues on to the next level. Modern tools of communication allow for updating the information receiving, storing, and transmitting. Besides, they reveal the prospects of art education, musical pedagogy, and cultures interaction.

MCT provides a new understanding of musical folklore of the Far East of Russia and China in particular and the music of the peoples of the world in general. It is necessary to create a "music bank" - namely, a single catalog, available for the storage and future use of the national musical culture samples.

The information technology and MCT have excellent pedagogical prospects (Gorbunova: 2014; Gorbunova & Chibirev: 2019). They are developed to facilitate and improve the knowledge access, increase the interactivity level, provide student-centered approach (Gorbunova & Hiner: 2019; Gorbunova & Voronov: 2018, pp.15-19; Gorbunova & Zalivadny: 2018, pp.55-64; Hoffer & Bailey: 2016; Jiang: 2007; Kabalevsky: 2005; Koroleva: 2011, pp.171-182) and, undoubtedly, can and should serve as a tool for studying and saving the national cultures. The musical education uses the samples, connecting folklore with the norms of European thinking, and provides interesting prospects for the study and research understanding of the dialogue of the culture in the East-West aspect.

Network interactions between different cultures in a single educational space have great development prospects, as they do not only meet purely practical requirements (mastering the material on a different qualitative level), but also become a new means of knowledge transfer. They also resolve issues of interethnic tolerance and harmony, multinational unity, which are the most important approaches in the educational process in Russia and around the world.

Thus, MCT is very important for the processing, transmission, and saving of the national musical culture, as well as for the preservation, development, and popularization of traditional cultural heritage. In this context, MCT presents a new type of accumulation and transmission of musical knowledge and a tool for source data processing. It is impossible to overestimate the prospects of digitizing of musical heritage collections since the issues of traditional culture preservation and development are highly valuable.

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