

Music Computer Technologies, Supply Chain Strategy and Transformation Processes in Socio-Cultural Paradigm of Performing Art: Using Digital Button Accordion

Irina B. Gorbunova^{*1}, Natalia N. Petrova²

*Herzen State Pedagogical University of Russia, St. Petersburg, Russia,
gorbunova7575@yandex.ru*

Abstract. The article traces the transformation of the socio-cultural paradigm of button accordion performing as a dichotomy of traditional and innovative cultural directions. The authors carry out a diachronic analysis of the formation and development of electronic button accordion playing in the XX-XXI centuries, analyzing the psychoacoustic transformation of the socio-cultural perception of the musical electronic environment, identify the causes of social devolution of electronic button accordion in the XX century, and carry out a historical and cultural analysis of the process of the revival of performing on various modifications of electronic harmonicas in Russia. Performance on a digital button accordion is seen as a logical outcome of the evolution of the instrument accordion complex and the socialization of instrumentation in the new socio-economic conditions of the digital society. The article reveals the features of the formation of performance on a digital button accordion in the modern high-tech process of musical creativity, which opens up great prospects for contemporary forms of cultural and socio-cultural activity of a modern musician. Music and computer technologies are considered as an integral part of the cognitive-creative component of the work of the modern musician of the digital age.

Keywords: *digital button accordion, electronic button accordion, harmonica, electronic musical instruments, musical culture, high-tech creative environment, Supply chain strategy, musical and computer technologies, intercultural communication, broadcasting of musical culture.*

1. Introduction

1.1. Problem statement

Since the middle of the XX century, electronic musical creativity has created a powerful foundation for the means of expressiveness of music, penetrating into the space not only of academic genres but also in the field of music for theater and cinema, of various kinds of performances in their style. At the edge between the twentieth and twenty-first centuries, a new direction in musical creativity and musical pedagogy arose, due to the rapid development of information technology and digital musical

instruments (from simple synthesizers to powerful musical computers), a new interdisciplinary sphere of the musician's professional activity related to the creation and use of specialized musical software and hardware requiring knowledge and skills - music and computer technology (MCT) [1], [2]. This concept is used by specialists in various musical fields. The semantic and morphological properties of musical compositions created with the help of MCT can be considered as abstract levels of musical culture, which was developed under the conditions of functioning of a high-tech informational creative sphere - a virtual educational and creative environment in the field of culture [3]. Being a phenomenon of cyber culture, the idea of virtuality, which finds its logical and artistic interpretation and embodiment in musical creativity of various genre and style directions, is determined today by the inclusion of MCT in the sphere of musical culture and is treated as an artificially created medium [4], [5], [6]. MCT gives almost unlimited possibilities in creating sound elements, determined only by the artistic and aesthetic needs of media and folklore researchers, folk musicians and a wider circle of professionals and listeners [7]. The emergence and development of a modern computer recording studio as an instrument of musical creativity and the phenomenon of modern musical culture [8] contains elements that preserve the traditions and mechanisms of cultural inheritance in the context of historical continuity and the translation of cultural values and meanings today. In a situation of increasingly intensified processes of interaction and interpenetration of various cultures at the intercontinental, interethnic and interstate levels, modern means of cultural transmission are of particular importance. The now real possibility of transmitting online information of virtually any format opens up new horizons for adequate data transmission, accelerates many times the "exchange processes" within the framework of the problem of cultural dialogue. The authors of [9]

come to the conclusion that MCT can play a significant role in the development, broadcast, and preservation of the musical culture of the peoples of the world, as well as the preservation, development, and popularization of the traditional cultural heritage of multinational Russia. Historical, philosophical and mental aspects of the development of the theory of culture in the conditions of the existence of the information and communication space, the system of disseminating cultural values and introducing the population to culture in a virtual creative environment, the emergence and development of a modern cultural phenomenon - a computer recording studio as a tool for preserving musical creativity, the formation of a new cultural and the cultural phenomenon of MCT - all these features of the distribution and reproduction of value. In the future, digital humanities create additional opportunities for preserving and broadcasting the traditional musical cultures of the world's peoples. Nowadays, researchers must set new goals: it is necessary to explore as soon as possible the resources and possibilities of applying modern information and communication technologies, the latest MCT for the collection, adequate processing, preservation, transmission, and broadcast of traditional musical culture, as well as understanding of their role and significance in the field of cultural dialogue and intercultural communication. The mechanisms specified in articles [10], [11] for preserving, disseminating, and reproducing the values of musical culture collected by folkloric musicians in the natural environment of folklore, the subsequent processing of the material with careful attention to the source can help to identify its historical and artistic value. Each ethnos has its own folk music, reflecting its deep essence, creating a "concretization of attitude" [12]. **"Folk music**, according to the philosopher A. Losev, finds us in the world as a whole, for if music, in general, is a depiction of the inner life of spirit and being, then folk music is at the same time both we ourselves and that longed-for depth of the universe <... > We feel when painting these depths, as at **home, this is our Russian depth**, and **this is our place in the world as a whole**" [12]. To reveal the deep essence of an ethnos, national musical instruments also help, whose ethnophony meets the aesthetic ideal of a particular ethnos, reflecting the "national flavor of tradition, customs," being "a song and a mirror of the soul of an individual nation" [13]. A striking example of the socially significant role of a

musical instrument in the life of Russian society is the "harmonica"¹ and its most perfect variety - the chromatic harmonica - **button accordion**². The history of the appearance of manual³ wind harmonica and the rooting of its various varieties in the life of Russian society is described in detail in the works of a number of researchers of folk instrumental creativity, for example, G.I. Blagodatov, M.I. Imkhanitsky, A.M. Mirek [14], [15], [16] and others, the unprecedented socio-cultural influence in Russia (in the XX century — in the USSR) of "folk" musical instruments, in particular, harmonica, was considered in the works by D.I. Varlamov, M.I. Imkhanitsky, G.A. Pozhidaev, O.M. Sharov, I.V. Matsievsky, L.A. Mishchenko, and others [17; 18; 19; 20; 21; 22]. It is safe to say that in the middle of the XX century a cult of harmonically-button accordion-performing performance took shape in Russia. L.A. Mishchenko very capaciously expressed the opinion of a large army of fans of this instrumental genre: "The significance of the button accordion for Russian national culture is enormous, for it is associated with the spiritual life of the Russian people" [23]. Confirmation of such a vivid sociocultural phenomenon as was the performance using the button accordion in Russia is provided by numerous documentary evidence: memoirs of contemporaries⁴ [21], literary monuments⁵, domestic films⁶, etc. During its short, by the standards of history, way of becoming accordion-playing as an "artistic instrumental complex"⁷ [22], affecting the socio-cultural paradigm of the "image of the accordion" as a *traditional Russian folk instrument*, the construction of the button accordion underwent numerous changes⁸. One of the modifications of the button accordion can be considered the electronic version of the instrument⁹. In recent decades, with the total computerization of all spheres of life in the modern information society, new forms of cultural practice, including electronic music-making, have become relevant. Along with the popularization of performance on digital keyboard synthesizers, digital pianos, musical computers (MC) [24], [25], there is a growing public demand for the development of innovative digital (electronic) harmonica¹⁰, which in appearance and design are completely reminiscent of a multi-timbre, ready-to-choose acoustic button accordion, and therefore called the digital button accordion [26]. The purpose of this study is to consider the

transformation of the socio-cultural paradigm of musical instrument performance in the XX-XXI centuries on the example of the accordion instrument complex and analyze the change in the surrounding sound environment and the socio-cultural perception of musical electronics, the change of the “intonation dictionary of the era” (according to B.V. Asafiev).

2. Literature review

“ Harmonica” and its great species diversity (accordion, button accordion, piano accordion, concertina, bandoneon, and many others), united by a common genesis and sound extraction principle (a slipping tongue in a metal frame, oscillating under the influence of an airstream), as well the socio-cultural role of these tools in the history of the development of their ethnic group are covered by researchers from different countries: in [20], [18], [14], [27], [28], [29] [30], [31], [32], [33]. Each ethnos has own preferences in choosing “folk” things, the most popular instrumentation, whose ethnophony with a specific timbre-acoustic complex most suited the society’s request for everyday music-making: in Russia, it was accordion and button accordion; in Germany, France, America - a piano accordion, in Argentina - a bandoneon, etc. All researchers agree that the ancient Chinese labial organ Shen, from which the principle of a slipping tongue was borrowed, is a distant ancestor of modern harmonicas. Also, all researchers are unanimous in determining the relevant value and role in the further evolution of the instrumental complex of the first patented “Accordion” of the Viennese master K. Demian. But the long-standing version of the German origin of the prototype of the harmonica, made in 1822 by the organ master F. Bushman, has been questioned in recent years and found its documentary refutation in the works of Russian ethno-organologists A. Mirek and M. Imkhanitsky [15; 16; 20] which convincingly prove that the prototype of modern harmonicas appeared in Russia in the 1780s. thanks to the Czech organ master F. Kiršnik, who was living in Russia at that time and first used his organs in the reed pipes instead of beating reeds, they slipped, riveting them to the metal strips (like in modern harmonicas). And it was precisely the instruments by F. Kiršnik with their new principle of sound generation that the German organist G. Fogler, known at that time in Europe, began to propagate (see more: [15]). This fact of the genesis of the instrumental complex, a principle fact for many ethnic organologists, was an

important basis in the definition of harmony, and then its more advanced chromatic design - button accordion - as a Russian folk instrument. Studies of recent decades show that harmonica and its varieties in the XIX-XX centuries developed rapidly and in parallel, independently of each other in different countries with greater or lesser intensity, often the inventions of the masters were duplicated. A large number of artisan workshops for the production of varieties of harmonicas have appeared in the world. In Russia, the species diversity of only a harmonica totaled more than 200 names (according to the name of the area - Vyatka, Bologoevskaya, Livenskaya, etc.), not counting the various national varieties [18]. Regional features of the formation of accordion-playing in Russia are highlighted in the works by V.V. Ushenin [34], T.A. Budanova [35], as well as S.A. Moskvichyova (“Tambov accordion as an original layer of traditional musical culture”. Saratov, 2013), A.N. Sokolova (“Adyghe harmonica in the context of ethnic musical culture”. Maykop), etc. The authors of the studies conduct in their works a historical and cultural analysis of the assimilation of harmonics into the ethnocultural musical layer and the socio-cultural role of harmonicas in the life of society and the inculturation of the personality is revealed. The issues of academization of performing socialization and folk instruments, in particular, button accordion performance, as well as analysis of the consequences of professionalization folk genre instrumentalism studied by V.V. Bychkov [36], D.I. Varlamov (“Metamorphoses of musical instruments: neo-philosophy of folk instrumental art of the XXI century “ , 2009; “ Academicization of folk art and the education of folk instrument performers” , 2014), I.V. Matsievsky (“ The 100th anniversary of the button accordion: paradoxes and antinomies” , 2009; “ On the problem of defining the concept of” folk musical instruments” , 2015; “ Folk musical instrument and the methodology of its research (On the pressing problems of ethno-instrumentology, 1980”). The great socio-cultural role of /button/ accordion-performing in the life of Russian society and its current state is highlighted by L.A. Mishchenko [37], O.M. Sharov [22], G.A. Pozhidaev [21] and many others. The aspects of performing skills, methodology and teaching methods for playing the button accordion are devoted to the work of many famous performers, teachers. Among others, the most noticeable are the works by V.A. Maksimov [38], V.V. Ushenin [34],

B.M. Egorov (“On the systematization of button accordion strokes”, 1984), F. Lips (“The art of playing the button accordion,” 1985) and others. Portrait characteristics of professional mastery of prominent representatives of button accordion art are described in reference books, encyclopedias, collections of articles (for example, [39]; “The button accordionist's manual”, compiled by A. P. Basurmanov, 1986).

3. Materials and methods

In this study, the authors rely on extensive empirical experience in performing both on various designs of acoustic button accordions (3-5 rows, with bass-chord and ready-to-play accompaniment), and on the digital V-accordion FR-3-xb Roland, as well as on the materials of the site “Creative Workshop of Vladimir Butusov” (www.bajanist.ru) and the video channel of a professional accordion player (Vladimir Butusov - YouTube), one of the developers of the Russian MIDI system for the modernization of all types of acoustic harmonica. To conduct the study, the authors used a comparative analysis of acoustic and electronic instruments, diachronic analysis of performance on the electronic button accordion in the XX-XXI centuries, a socio-cultural analysis of the transformation of the perception of the electronic performance of the past and the present. Considering the digital button accordion as an aspect of the multidimensional integrity of the button accordion culture and establishing correlation interconnections of electronic and acoustic performance, based on socio-cultural perception on the historical role of the harmonica instrument in the life of Russian society, we conduct comparative, diachronous and synchronous, socio-cultural analyzes. Considering the use of the digital button accordion as a means to create a special immersion sound environment in various concert-presentational forms, we conduct a synesthetic analysis of the socio-cultural perception of digital performance. The structural and functional analysis of arrangements for a digital button accordion helps to understand the concept and conceptualization of the interpretative decision of the arranger-performer. Considering the process of integrating the performing complex on the digital button accordion into modern music education, we use synergetic (the educational process can be built-in synergy with acoustic performance) and competency-based (involving the determination of goals, content, structure, methods, and forms of the educational process) approaches.

4. Results and discussion

Since the advent in the free circulation of electronic musical instruments (EMI), since about the 1960s, there was a gradual change in the into national paradigm in society. The evolution of EMI and the expansion of the range of their application (not only on stage, mainly in relation to popular pop culture, but also in everyday life), the use of music recorded using synthesizers (for example, the ANS photo electronic optical synthesizer E.A. Murzina¹¹), for dubbing movies, television shows, etc. - all these led to a change in the psychology of auditory perception of electronic (created and reproduced using EMI), and then computer music (created on a computer) in society, there was a gradual leveling and unification in the auditory perception of the individual analog and digital sound recording equipment due to perfection, quality of modern EMI and MCT. In the XXI century, a modern musically inexperienced listener is unlikely to be able to distinguish how the score of the piece was recorded: a large symphony orchestra in the studio or it will be a high-quality phonogram, the result of the work of one arranger at MC. The very first samples of musical electronics in the XX century significantly differed in acoustic perception from traditional acoustic instruments, which undoubtedly influenced the socio-cultural paradigm of musical electronics. The genesis of the appearance of electronic versions of button accordions, of course, is associated with the XX century, the century of the rapid development of musical electronics¹², both abroad and in Russia¹³. “Those intonations that turn out to be maximally stable and comfortable and under given conditions become necessary and habitual”. “People, culture, era - writes an outstanding Soviet musicologist, founder of the theory of intonation B.V. Asafiev in his book “Musical form as a process” - in their historical life determines the stages of intonation, and through intonation the means of expression of music (and instrumentation, author's note) and the selection and interconnection of musical elements are also determined”. The pioneer-performer on the electronic button accordion throughout the post-Soviet space is rightly called the legend of the button accordion instrument genre - Anatoly Vladimirovich Belyaev. During a tour of Europe, Belyaev first heard an electronic organ, the richness of timbre colors and the performing power of which impressed the accordion player. The idea of combining the natural timbres of the button accordion with the

capabilities of an electric organ took hold of the musician. Together with the button accordions designer, Yu. Volkovich, he began the development of the concept of a new instrument. According to their suggestions and recommendations, the Italian company “Farfiza” in 1965 produced, in collaboration with specialists from the Chicago Music Institute, an electronic button accordion¹⁴. It was the first and only instrument of its kind in the USSR at that time¹⁵. In 1979, another, more advanced “Klavin” instrument was designed for Belyaev (designers Yu. Volkovich and A. Yavelov), which was a combination of a modern, ready-to-choose button accordion with an electronic organ. How, at that time, was a strange instrument seen by society? Here is what the famous balalaika player, People's Artist of the Russian Federation, Professor P. Necheporenko wrote, in the annotation to one of the albums of A. Belyaev's records: “The effects and timbres of electronics did not obscure the live sound of the button accordion: the emotional fullness of music, its breathing remained largely in the natural voice of the button accordion, in the art of mastering bellow, in strokes, in articulation, etc. The possibilities of electronics filled the “score” with orchestral sound and new timbre colors. And most importantly, in this unique combination of traditional and ultramodern, music has not left the emotional control of the performer” (A. Belyaev “Electronic button accordion”. Soviet masters of the button accordion art. Iss. 20. “Melody”, 1989. P. 10.). The enthusiasm of the audience who came to the musician's numerous concerts, the high opinion of colleagues about Belyaev's performance, and not only the accordionists, however, did not cause a “boom” for those who wanted to play the electronic accordion. Belyaev even had few followers - performers on electronic button accordions. For example, the famous in the USSR ensemble of electric musical instruments directed by V.V. Meshcherin played electric accordion¹⁶. Famous domestic models of electric accordions of that period are “Estradin - 8 B”¹⁷ and “Topaz”¹⁸. In accordance with the concept of the “socialization” of the instrument [17], proposed doctor of art D.I. Varlamov, at that time had a negative evolution coefficient, since the Russian population had no creative need and economic ability to acquire instruments of this level, and accordion musicians often did not have the necessary competencies, for the development of power tools at a decent professional level (how

to make arrangements and arrangements for the electric accordion, what repertoire to play, etc. - all these issues are performers on electronic accordions decide on their own, as in the system of national professional music education was not educational training and performing on power tools programs). Summarizing the above, it can be stated that the performance on the electric accordion in the XX century was ahead of its time. As rightly noted by Academician B.V. Asafiev: “In essence, when one or another medium rejects any music new to it (or, as in our case, music technology - approx. N.P.), although **this music**, as is usually the case later, **was quite modern for the era**, which mistrusted her, - an unusual role is played by unusual forms of expression of this music” [italics is ours - I.G., N.P.]. The digital revolution that began in the 1980s gradually influenced all spheres of human life: changed the habits of people, their social behavior, ways of spending leisure time, changed the structure of the world and the role of man in it, changed the environment surrounding a person. Mass computerization and informatization of society actualized the population's request for new forms of cultural practices. Musical electronics has long and firmly entered the field of musical performance in all, without exception, instrumental and vocal genres: it is impossible to hold a concert in a large hall, and even more so in an open area (open-air) without using the sound of the instrument using a microphone, audio amplifiers, or a mixing console; audio recordings of performers, in particular accordion accordionists, in professional recording studios are processed by sound engineers with the addition of special effects and filters (reverb, chorus, etc.). The professionalism of the sound engineer influences on how “natural” the timbre of an acoustic instrument will be when building an equalizer. Various musical power tools and sound modules of MCT have not been surprising for a long time and are being mastered with pleasure by both professional musicians and amateurs. Meeting the realities of the time and integrating into the system of show business, musicians change the stage forms of modern concert performance and work, taking into account mainly the tastes of the mass consumer, focused on entertainment and entertainment. The traditional use of minus phonograms by musicians in their creative and concert practice, the use of lighting and multimedia equipment in the process of concert performance to create a synesthetic perception, a sense of

immersion and involvement in the stage performance, is becoming traditional for modern musical performance. In today's sociocultural space, the surrounding sound environment (background design of stores, musical audio-visual content on the Internet, computer games, etc.), including music, is becoming more and more "electronic" (computer, digital). The quality of sound recording equipment that has grown in recent decades, modern digital musical instruments capable of imitating the sound of any acoustic instruments in a very realistic way, modern stage equipment - all this was the key to the transformation in the society of acoustic perception of the electronic sound. In the digital age, with the

development of high-tech informational educational and creative environment, the population's demand for performing on EMI, and in particular for performing on innovative digital button accordions and MIDI harmonicas (see, for example, demos of MIDI system B) is growing. URL:https://youtu.be/Vv_QXfNtpvw, familiarizing with MC, MCT. In socio-cultural perception, a modern multi-timbre acoustic concert button accordion and an electronic button accordion (for example, digital V-accordion Roland) are identical, first of all, in the appearance of the structure (see Fig. 1. "Multi-timbre ready-to-choose acoustic accordion" and Fig. 2. "Digital V-accordion Roland").



Figure1. Multi-timbre ready-to-choose acoustic button accordion



Figure2. Digital V-accordion Roland

Many contemporary performers often appearing in television programs on central Russian television channels (for example, the Bayan-mix duet (S. Voitenko - D. Khramkov), P. Dranga, A. Gainullin, the button accordion player of the Lyube group, V. Butusov, S Frolov et al.), who, in fact, define the “performing fashion on EMI, use digital button accordions on the concert stage, using harmonica timbers and using the technique of” traditional bellows”, as on acoustic instruments (this audiovisual tandem is “timbre - bellow studies” is essential when the recognition mark of “folk” instrumentation and the timbre of harmonica has become a peculiar sign-symbol in the genetic Russian cultural code). Performers on EMI often use it, mainly, as a “loud analog” of an acoustic instrument, therefore in modern society, there is no difference in perception between the perception of acoustic and electronic/digital accordion performance. From the point of view of the inexperienced in the professional subtleties of the performance of the accordion listener, any instrument construction (whether mechanical or electronic), if it is a button from 3 to 5 rows in the right keyboard (regardless of the bevel of the bar relative to the keyboard, is “straight” or “At an angle” ; to the traditional keyboard layout system for our country, the so-called B-griff or European - with C-griff, and other professional subtleties (including the classification of Hornbostel's musical instruments - Sachs on the difference origin of aerophones and electrophones) - this will be the “button accordion” beloved of the heart, which played an invaluable sociocultural role in the life and musical culture of our people during the Great Patriotic War and the post-war restoration of Russia from ruins [23, 26].

5. Conclusion

In the modern cultural process, digital button accordion performance has found its way to the hearts of professional musicians and listeners. Digital accordion performance in its various aspects (educational, communication, cognitive, etc.) from the perspective of both the possible continuity of the traditions of the national accordion performing school [26], and from the perspective of the multifunctional character of a new digital instrument, is an important element of culture, expanding the creative horizons of the musician of the digital era.

5.1. Modern digital button accordion performance is a dichotomy of the traditional things

when the instrument is used as a “loud analog of the acoustic accordion” (without changing either the repertoire or manner of performance) *and innovative*,

when the digital musician uses the entire spectrum of the instrument's functionality, allowing the digital accordion player to go beyond the narrow limits of the instrumental genre and become a musical cosmopolitan (polytemporality, use during the performance of phonograms via the built-in USB port, mixing and sound-design, etc.). As one example of the innovative use of the instrument, we present the performance of composition by F. Glass “Escape” (URL: https://youtu.be/j_43p_CzZZ4), where the arranger-performer in the framework of the solo performance “In the Enchanted Castle” based on the work by N. Karamzin (reader A. Zinatulin, Tver), a sound synesthesia immersion medium was created. The innovative direction in the work of accordionists requires not only the performer's mastery of the instrument as a traditional acoustic instrument, but also deep interdisciplinary knowledge in the field of instrumental studies, sound engineering, MCT and the cognitive-creative mode of thinking in order to build a complex timbre tectonic design of a musical work using the multifunctional character of EMI. At present, there is no professionally oriented training in digital button accordion in the system of domestic music education, this type of instrumental creativity is developing as an experimental direction, where the personal aspect of the digital button accordion player himself and his cognitive-creative beginning often prevail. As the Russian philosopher A.F. Losev says, “anything is itself and presupposes an infinite number of ways of its givenness in another being, an infinite number of methods of interpretation <...> endless forms of manifestation of a thing are fixed in the thing itself, at least as an opportunity”. Digital button accordion is an area of creative knowledge of the digital musician of the digital age. The same piece of music on the same digital button accordion can be “solved” /represented by a variety of arrangements (timbral combinations, the use of a multi-layer phonogram minus and much more) and interpreted by musicians in different ways, which, depending on the sound result and mastery of a digital musician, and will determine a different socio-cultural attitude to digital performance - from negative to enthusiastic. In the context of the modern digital information space, musicians have a need to master new high-tech forms of concert performance and socio-cultural activities. In the conditions of the existence of clip culture, the population's demand for entertainment, showiness, and synesthesia of cultural creativity is growing, which causes great interest in multifunctional musical performance on EMI and the development of MCT [40]. The illuminated range of issues related to performing on EMI, the integration of MCT into a

modern multifunctional high-tech process of musical creation using the example of playing on a digital button accordion are considered by the authors as components of a single modern cultural process of musical education and creativity, which opens up great prospects for relevant forms of cultural and socio-cultural activity contemporary musician. MCT are considered as an integral part of the cognitive-creative component of the work of the musician of the digital age.

6. Notes

¹ The word "Harmonica" in various explanatory dictionaries has several meanings, including those not related to musical instruments. In the context of our study, we are interested in the definition of a "harmonica" according to M.I. Imkhanitsky as "an extensive class of instruments in which the sound source is a metal tongue, oscillating in the frame under the influence of an air stream. Harmonicas are classified depending on the method of supplying air to metal tongues and can be labial, manual, or foot" [18]. Manual varieties of instruments include accordions, button accordions, harmonicas, bandoneons, button accordions, etc.

² Button accordion (in Russian "bayan" from the old Slavic language - "to tell", "to talk", "to broadcast"). The instrument is named after the old Russian singer - storyteller Boyan, mentioned in the famous literary monument of Ancient Russia "The Song of Igor's Campaign".

³ Manual wind harmonica is a portable harmonica that could be played on the go. In Russia, the definitions of "manual and wind" have disappeared, and the definition of "harmonica" has changed into the Russian way - "accordion" [14].

⁴ *Pozhidaev G.A.* (ed.) Music on the fronts of World War II. Moscow: Music, 1970. 256 p.; *Mikhaylov A.* Who was the most welcome guest in a Soviet company? [Electronic resource] URL: <https://informburo.kz/stati/kto-by-l-samym-zhelannym-gostem-v-sovetskoy-kompanii.html> (access date 10.04.2019)

⁵, for example, *Tvardovsky A.* Poetic poem "Vasily Terkin" (Ch. 8 "Accordion")

⁶ "Volga-Volga" (1938, dir. by G. Alexandrov), "Accordion" (1934, dir. by I. Savchenko), "A while back in Penkovo" (1957, dir. by S. Rostotsky), "Ivan Brovkin" (1955, 1958, dir. by I. Lukinsky) and many others.

⁷ According to the doctor of arts, D.I. Varlamov, the constituents of the "art complex" are the organics of the instrument (timbre, construction, structure, etc.),

the performing school and music (original or arranged) performed on this instrument.

⁸. The design of the button accordion underwent a lot of improvements. The known designs include those by P. Sterligov, N. Sinitsky, V. Hengstrem, P. Gvozdev, and many others (for more details, see [14, 20]).

⁹ In accordance with the international classification of musical instruments of Hornbostel-Sachs adopted in instrumentation, according to the sound source and the principle of sound extraction, acoustic and electronic button accordion belong to a different class of instruments: "self-sounding aerophones" and "electrophones", respectively. [Electronic resource] URL:

<https://en.wikipedia.org/wiki/Hornbostel%E2%80%93Sachs> (access date 01.04.2019).

¹⁰ The authors consider two versions of the electrophones: 1) electronic and 2) electro-mechanical (acoustic instrument, modernized by the built-in MIDI system).

¹¹ The synthesizer ANS was named by designer E. Murzin after the Russian composer A.N. Skryabin. The Moscow Experimental Studio of Electronic Music was based on this device. Without limitations in timbre, ANS allowed the use of artificial voices and noises; compose music using any frets and scales that exist on Earth. Famous composers E. Artyemyev, S. Gubaidulina and others began their sound experiments on this synthesizer [Electronic resource] URL: <http://www.theremin.ru/archive/murzin0.htm> (access date: 01.03.2019)

¹² The first experiments on the creation of electric musical instruments have been known since the XVIII century [8].

¹³ In Russia, the distribution of electric musical instruments began with the advent of the "Optophonic (color music) piano" by V. Baranov (1916), "Thereminox" by L. Theremin (1919) and "Variophon" by E. Sholpo (1931) and others. that have become the initials for future generations of tools.

¹⁴. Electronic button accordion of Anatoly Belyaev. Change, 1965, No. 925 / [Electronic resource] URL: <http://smena-online.ru/stories/elektronnyi-bayan-anatoliya-belyaeva> (access date: 01.03.2019)

¹⁵ Interview with pioneer of electronic performance on the button accordion in the USSR, A. Belyaev [Electronic resource] URL: <http://portal-kultura.ru/articles/music/34755-anatoliy-belyaev-eleonora-ruzvelt-rastrogalas-i-potselovalala-menya/> (access date: 02/01/2019) and an annotation to one of his records [Electronic resource] URL <http://fremus.narod.ru/bel89-a.html> (access date: 02/01/2019), indicating the first performing

experiments on electronic button accordion and socio-cultural perception of it in the XX century.

¹⁶ Numerous audio recordings of the ensemble are known, which were soundtracks to many television and animated films in the USSR, in particular, to the animated series "Wait a minute!" by Soyuzmultfilm studio.

¹⁷ According to the source, the prototype of the combined electronic button accordion, first created in the USSR at the Zhytomyr Plant "Electrical Metering Tools" in 1970, was Estradin-8B. Its overall dimensions were: 1) acoustic unit (without legs) 1000x500x300 mm; 2) electronic unit 700x510x 270 mm. The mass of such an instrumental complex was: 1) mechanical button accordion - 14 kg; 2) acoustic unit - 30 kg; 3) electronic unit - 31 kg. The first performer on such an instrument was one of its creators - Alfred Griber. The acoustic parameters of the instrument were evaluated by listeners as very interesting [Electronic resource] URL: <http://www.ruskeys.net/base/estrdn8b.php> (access date: 01.03.2019)

¹⁸ This tool was produced (according to eyewitnesses - data from the Golden Accordion forum ([Electronic resource] URL: <http://www.goldaccordion.com/other/582-yelektrobayan-topaz.html>) in two versions - 1) with a bellow, with which the dynamics of the performance was controlled, and 2) without a bellow when the dynamic shades were adjusted using the foot pedals ([Electronic resource] URL: <https://youtu.be/5o7xvPXAE6Q>)

References

- [1] Gorbunova I.B. *The phenomenon of music computer technologies as a new educational creative environment*. Bulletin of Herzen Russian State Pedagogical University, No. 4 (9). Pp. 123–138, 2004.
- [2] Gorbunova I.B. *Musical instruments as synthesizers of musical sound*. Music computer technologies: collection of articles. St. Petersburg: Herzen Russian State Pedagogical University Publishing House, Pp. 130-138, 2018.
- [3] Belov G.G., Gorbunova I.B. *Cybernetics and music: Problem statement*. Society: philosophy, history, culture. No. 12. Pp. 138-143, 2016.
- [4] Gorbunova I.B. *"Automatic compositions" as predecessors of the use of cybernetics in music*. Society: philosophy, history, culture. No. 9. Pp. 97-101, 2016.
- [5] Gorbunova I.B., Orlova E.V. *Digital technologies in the theory and practice of teaching musical art and creativity*. The world of science, culture, education. No 2 (69). Pp. 309-311, 2018.
- [6] Gorbunova I.B. *Electronic Musical Instruments: To the problem of the formation of performing skills*. In the collection: Music computer technologies. Collection of articles. St. Petersburg, Pp. 334-344, 2017.
- [7] Gorbunova I.B. *Computer recording studio as an instrument of musical creativity and the phenomenon of musical culture*. Society: philosophy, history, culture. No. 2. Pp. 87-92, 2017.
- [8] Alieva I.G., Gorbunova I.B., Mezentseva S.V. *Music computer technologies as a tool for broadcasting and preserving musical folklore (using the example of the Russian Far East)*. Problems of music science. No 1 (34). Pp. 140-149, 2019. DOI: 10.17674/1997-0854.2019.1.140-149
- [9] Alieva I.G., Gorbunova I.B. *Musical creativity of verbal tradition: to the problem of preserving the intangible cultural heritage*. The world of science, culture, education. No. 6 (67). Pp. 314-318, 2017.
- [10] Aliyeva I.G., Gorbunova I.B. *On the project of creating an intellectual system for cataloging and analyzing the music of the peoples of the world*. Society: philosophy, history, culture. No. 9. Pp. 105-108, 2016.
- [11] Matsubara, M., & Yoshida, H. fostering autonomous learners of vocabulary acquisition using content-based ict methods. *Humanities & Social Sciences Reviews*, 6(1), 36-43, 2018. <https://doi.org/10.18510/hssr.2018.617>
- [12] Blagodatov G.I. *Russian harmonica*. Saint Petersburg: Muzgiz, 180 p, 1960.
- [13] Imkhanitsky M.I. *The history of accordion and accordion art*. Moscow: Publishing House of Gnessin Russian Academy of Music, 520 p, 2006.
- [14] Matsievsky I.V. *Folk musical instrument and the methodology of its research (On the urgent problems of ethno-instrumentology)*. Actual problems of modern folklore: collection of articles and materials. Composed by V.E. Gusev. Saint Petersburg: Music, Pp. 153-159, 1980.
- [15] Mirek A.M. *Harmonicas Reference Book*. Moscow: Music, 131 p, 1968.
- [16] Pozhidaev G.A. (ed.) *Music on the fronts of World War II*. Moscow: Music, 256 p, 1970.
- [17] Mishchenko L.A. *Accordion as a phenomenon of musical culture in the reflection of social reality*. Science. Art. Culture, No. 3(7). Pp. 40-47, 2015.
- [18] Belov G.G., Gorbunova I.B., Gorelchenko A.V. *Music computer. A new instrument for a musician. Methodical manual*. St. Petersburg, 2006.
- [19] Gorbunova I.B., Zalivadny M.S. *Information technology in music. Vol. 4. Music, mathematics, informatics: Textbook for students of higher educational institutions studying in the direction 050100 - Pedagogical education*. St. Petersburg: Herzen Russian State University Publishing House, 290 p, 2013.

- [20] Petrova N.N. *Digital button accordion: new opportunities based on old traditions. Innovative forms of teaching in the Children's Art School and Children's Music School*. Corresponding editor: E.V. Orlova, A.V. Chernyshov, L.N. Shaimukhametova. Moscow: International Centre "Art and Education", Pp. 53-55, 2013.
- [21] Puchnowski W. *Katalog pisemnych prac dyplomowych studentów katedry akordeonistyki AMFC*, Warszawa, 1996.
- [22] Monichon P. L' accordéon. Payot, Lausanne, Suisse. 1985.
- [23] Richter G. *Akkodeon Handbuch für Musiker und Instrumentenbauer*. VEB Fachbuchverlag, Leipzig. 1990.
- [24] Charuhas T. *The Accordion. The Golden Age of the Accordion / By R. Flynn, E. Davison, E. Chavez*. San Antonio, Texas, 1992.
- [25] Gervasoni P. *L'Accordéon, Instrument du XXème Siècle*. Paris, 1986.
- [26] Harrington H.S. *Accordion. The New Grove Dictionary of Music and Musicians*. Ed. 2. Vol. 1. Tauton, USA, 2001.
- [27] Häffner M. *Harmonicas*. Trossingen, 1991.
- [28] Mishchenko L.A. *Accordion as a phenomenon of musical culture in the reflection of social reality*. Science. Art. Culture, No. 3(7). Pp. 40-47, 2015.
- [29] Maksimov V.A. *Button accordion. Basics of performing arts and pedagogy*. Psychomotor articulation on the button accordion. Manual for students and teachers of music schools, colleges, and universities. St. Petersburg: "Composer", 255 p, 2004.
- [30] *Portraits of button accordion performers: Collection of articles*. Composed by M.I. Imkhanitsky, A.N. Yakupov. Moscow: Publishing House of Gnessin Russian Academy of Music, 300 p, 2000.
- [31] *Button accordion and button accordion performers: collection of articles*. Issue 6. Composed by B.M. Egorov, S.M. Kolobkov. Moscow: Publishing House "Soviet Composer", 128 p, 1984.
- [32] *Electronic musical instruments. Theory and practice of performing skills: Collection of articles*. Composed by I.B. Gorbunova, K.B. Davletova. St. Petersburg: Herzen State Pedagogical University of Russia Publishing House, 212 p, 2017.
- [33] Gorbunova I., Hiner H. *Music Computer Technologies and Interactive Systems of Education in Digital Age School // Proceedings of the International Conference Communicative Strategies of Information Society (CSIS 2018)*, pp. 124-128, 2019. DOI: <https://doi.org/10.2991/csis-18.2019.25>
- [34] Gorbunova I.B. *Information technology in music and music education. World of science, culture, education*. No. 2(63). Pp. 206-210, 2017.
- [35] Gorbunova I.B. *Information and music computer technologies in music education. In the collection: Contemporary Musical Education - 2016: collection of materials of the 15th International scientific and practical conference*. Herzen Russian State Pedagogical University, Rimsky-Korsakov St. Petersburg State Conservatory. Ed. by I.B. Gorbunova. St. Petersburg, Pp. 44-51, 2017.
- [36] Asafiev B.V. *On folk music*. Composed by I. Zemtsovsky, A. Kunanbaev. Saint Petersburg: Music, 248 p, 1987.
- [37] Gromadin V.V. *The phenomenon of music in the digital age: the questions of the theory: Dissertation of the Candidate of Arts*. Moscow, 300 p, 2010.
- [38] Imkhanitsky M.I. *The history of accordion and accordion art*. Moscow: Publishing House of Gnessin Russian Academy of Music, 520 p. 2006, with images.
- [39] Losev A.F. *At the turn of the ages. Works of the 1910s - early 1920s*. Edited by A.A. Tahoe-Godi et al. Moscow: Progress-Traditsia, 1088 p, 2015.
- [40] Gorbunova I., Zalivadny M.S. *Musical synesthesia: statistical methods for studying the synesthetic laws of music. In the collection: Communicative strategies of the information society*. Proceedings of the 9th International scientific and theoretical conference. Pp. 283-288, 2017.