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Computer Technologies Usage in Higher Music Education System

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Abstract

The article is devoted to the computer technologies usage in higher music education system. Accordingly to the analysis of domestic and foreign studies, computer technologies play an important role in problem solving of general didactic-to-methodological training and learning methods implemented in program product. They complete functional system of interaction development between the teacher, the student and computer; training and learning program product development to student's future career. Proposed approaches' main advantage is the aggregation of these approaches on the one hand, and on another – computer use approaches in various experiments, as well as identifying general didactic process regularity. This article highlights that computer abilities currently are used not enough due to low general theory and methods of computer use development in teaching and learning music. In this regard, spontaneously empirical approach prevails in organization of such training and learning. Research results allow to apply computer in teaching musical-theoretical disciplines, as well as to use it in the Music Informatics curriculum.

Keywords: computer-based training (CBT) technologies, computer technologies, musical computer technologies, music teaching and learning technologies, music technology education, pedagogical technology, technologies in music education.

Introduction

Electronic textbooks creation problem for students' use in class and independently significantly actualized in music education of recent years. Different countries have attempted to create multimedia textbooks and manuals in different musical-historical and musical-theoretical disciplines.

Researchers highlight a new direction in musical creativity and musical pedagogy occurred at the turn of the XX and century XXI due to the rapid development of electronic musical instruments – from the simplest to the high-power music computers. Today's electronic musical instruments have embodied musical creativity and music-making technologies accumulated over the ages.

Personality traits of future musicians and educators are associated with their intellectual and professional potential formation in teaching and learning process capable for wide erudition, scientific work methodology and modern information technologies.

Thus, a clear demonstration of modern teaching methods and new CBT technologies development possibility takes place in modern music educational system, as the music art and music education are within the scope of modern society operational components.

It is impossible to realize these demands with the use of extensive methods. That is why modern didactics is actively looking for ways of teaching and learning intensify, one of which is the computerization of education.

General and special music education system has a necessity to be changed in accordance with information society development; educational institutions should be responsible for students' training in accordance with the needs of our time.

The most important musical computer technologies application and development areas today: MCT in professional music education (as a means to enhance creativity); MCT in general education (as a means of training); MCT as a means of physically disabled people rehabilitation.

On the verge of musicology and computer science, this area is affecting pedagogy, musicology, acoustical engineering and musical acoustics.

Music education suggests MCT as:

1. Direction of students' professional training;
2. Set of special musical disciplines provided in curriculum of a particular educational direction;
3. Set of musicians training methods associated with the work on the computer and used in the course of different disciplines development.

Methods

Computer and its usage show a variety of forms and techniques in teaching and learning process, in solving a large number of teaching tasks. This covers almost all the musical-theoretical disciplines. Thus, the computer in music education can act as a universal means of didactics.

CBT program products are constantly updated due to the emergence of a new, more sophisticated program product that replaces obsolete computer programs. In this regard, there is a need to find the most effective ways of teaching and learning construction and implementation with proper selection and realization of innovative teaching methods. Particular attention should be paid to the future teacher's self-education.

Objectives

Studies conducted by Polozov indicate that modern didactics is actively looking for ways of teaching and learning intensify, one of which is the computerization of education (Polozov, 2002).

In particular, the researcher analyzes the CBT history, which starts from the end of the 50s, when the first automated training system appeared in the USA. By 1960, a large number of programs was produced in the United States that covered all academic subjects, including art faculties' subjects.

Comparing these data, the researchers highlight that the music education automation process took place in Russia, albeit under different technical basis and with much smaller scale. Since the beginning of the 90s, the number of experimental work, carried out in the field of education computerization at different levels of education (school, secondary and higher education, training courses etc.) and in various subject areas, began to decline. In this sense, the computer has become a traditional means of education instead of unconventional.

The analysis shows that there was a possibility to equip computer system with an interface by the end of the 60s, allowing connecting a music keyboard to it in order to work with sound. This has contributed to program's production intensification, designed specifically for learning music, and to the emergence of new high-power educational centers involved in the study of computer technologies insertion problems in music education.

This computerization period in music education is characterized by two moments. Firstly, the program product was created mainly for new computer abilities demonstration as they were in need of practical development. Secondly, conducted experiments primarily pursued the aim to prove

computer's effectiveness and practicability in teaching and learning music. They also were aimed at CBT popularization, as it was to win a certain position in of music educational system.

In particular, many Ukrainian universities that train musicians (performers, musicologists, future teachers) have such educational disciplines as "Musical Informatics", "Sound composition, synthesis and processing with a computer", "Lyrics and sheet computer analysis", "Modern music technology" etc. Some pedagogical universities have the course "Computer set of notes", giving the opportunity to gain qualified sheets of their own in terms of reducing volume of musical periodical publications.

One way of modern ICT insertion in high musical and special educational systems is the creation and introduction of new courses aimed at mastering musical computer technologies. Attraction of these technologies in teaching of traditional, cultural, historical-theoretical courses and educational disciplines is no less important ("Music art history", "Music theory", "Analysis of musical works", "Polyphony", "Music teaching methods" etc.), as well as the creation of electronic teaching aids and multimedia textbooks for these courses.

Certain developments in this direction already exist. Faculty members of musical-historical disciplines are actively using MS Rower Point program features on multimedia presentations preparation, creating audio-visual support for their lecture material. Numerous multimedia encyclopedias are involved in self-study of various topics, abstracts making, creative projects creation.

In recent years, music education has an actualized problem of electronic textbooks creation for students' use in class and independently.

In recent years, certain musical-theoretical disciplines have e-learning development: "Polyphony" multimedia textbook, which author is Pyaskovskyy, professor of the Tchaikovsky National Music Academy of Ukraine. Dyadchenko, lecturer in history and theory of music of the Anton Chekhov Taganrog State Pedagogical Institute, shows an interesting experience of "Analysis of musical works" electronic textbook creating based on Microsoft Front Page.

The use of information and communication technologies, including media, is an important factor in musicians' training improvement at the present stage of information society development. One way to improve the music educational system is the electronic textbooks creation and saturation of multimedia educational publications market.

In particular, the electronic textbook as a resource containing systematic materials on a particular subject, the creation, dissemination and use of which is possible with the help of information technologies, should take into account the current requirements of electronic textbooks' design for higher educational institutions.

In addition, multimedia textbook use in teaching and learning process of musical-historical disciplines has proven its effectiveness: students became more interested in the historical aspects of Russian musical culture; they started to listen more music, actively attend musical performances, subject attendance has improved, computer literacy has increased. These are the proof of future musicians' professional competence improvement (Volynskiy et al., 2011).

Electronic textbook creating on Ukrainian sacred music in the form of a web-resource providing access to the information for a wider audience is the perspective of the authors' multimedia tutorial creative searches.

In this regard, Khusainova suggests future bachelors and masters' preparation is an important control improvement of targeted students' professional-informative activity process, which is possible under the teaching and learning process regularity identification and consideration, formation of skills.

At the same time, successful music educational management, students' professional creative implementation capacity formation, requires the use of not only traditional musical instruments, but modern electronic musical instruments: keyboards, multimedia computers equipped with programs aimed at music creation (Khusainova & Chegisheva, 2013).

Foreign studies are of particular interest in the context of our analysis. Crawford R. provides a brief review of technology adoption in education system of Australia paying the attention on music education. It is presenting some arguments consideration for modern technologies inclusion in music education. The author proceeds from the fact that technology has always been in music and music practice. However, composers and musicians are experimenting with sound and technology in modern music genres (Crawford, 2014).

Chia Hui suggests the music technology as a term commonly used to refer an electronic form of music art and, in particular, devices and software that allow simplifying the playback, recording, composition, storage, and performing a variety of tracks. This applies especially music technologies for children learning music: they offer children certain benefits from music technologies' realization by means of curriculum.

Results of the study show that musical courses can stimulate creativity and enhance a sense of cultural understanding and appreciation among schoolchildren (Ko & Chou, 2013).

Portowitz provides reports on different models of music education practice and evaluation using new technologies and modern teaching and learning theories by means of teaching music (Portowitz, Peppler, & Downton, 2014).

Kayar pays attention to the problem of music video resources creation that provides a new way for students to express themselves and to become more executive consumers of media information.

This article provides a new perspective on an informal musical pedagogy, allowing students to use proven video technology for music creation in music classes. Thus, students are able to create music videos that are informally developing their skills in music and technology.

The author offers his own experience as a teacher of primary grade, secondary school, ensemble director and a teacher of music that led him and his students engaged in technology to new testing methods outside of classes. These are video sharing sites such as YouTube that provide new ways for artists to create and distribute their skills by means of encouraging students. In accordance with these technologies, students have sufficient capacity to create music videos and to realize their own skills in music making.

The article offers practical advice on how to use video in music; the results of obtained studies are shown in (Cayari, 2014)мм.

Heath-Reynolds considers various approaches and opportunities for students' musical abilities formation. Music is considered as a means for understanding the modern information technologies, which allow meeting these standards and efficiency improvement in the class (Heath-Reynolds & VanWeelden, 2015).

Kilic aims his main research at studying the computer to implement the self-efficacy of students and music educators in terms of different variables of modern education (Kilic, 2015).

Researches are carried out on the basis of 124 teachers of music. The results show that students' gender creates a significant discrepancy in perception of both the fear of the computer (computer anxiety is significantly higher in female teachers) and self-efficacy (computer self-efficacy is higher in male teachers).

"It is important for teachers of music to accustom students to the modern media, which they use, to include a variety of technologies into daily teaching practices in order to improve literacy in our music classes" – said Kilic.

According to Carlisle, modern technologies can serve as a tool to enrich educational approaches in learning music and get a music education. This article describes how to use a variety of technologies as an additional tool that can provide students' feedback and enrich their knowledge and experience in developing and enhancing their self-expression (Carlisle, 2014).

In particular, Stowell highlights the importance of using such technologies as YouTube, mobile phones and MP3-players, which are increasingly integrated in UK secondary schools' curriculum. At the same time, there is a significant gap between the formal and informal approaches in teaching and learning music. In general, the training is integrated through musical mainstreaming (Stowell et al., 2014).

According to Sakai, one of the starting points is the regulatory requirements of a democratic liberal education. Music and the computer are considered in the context of musical pedagogy in order to provide convenient opportunities for democratic and informal teaching and learning music processes development that should be realized with a continuous critical review (Sakai, 2014).

According to Nielsen, music technologies are designed for use in musical program provision to musical composite skills development (Nielsen, 2013).

Sepp analyzes music education characteristics in general musical education of Estonia and Finland. The aim of the study was to find out which music teaching methods and teaching approaches are mainly used, as well as what musical education and prospects are supported by modern practice (Sepp, Ruokonen, & Ruismäki, 2015).

Data were collected through feedback from 107 Estonian and 50 Finnish teachers of music and have been studied by quantitative analysis. The results showed that the singing has a unique role in Estonian musical education, as well as a minor elementary music theory teaching importance in Finland. There is also a significant relationship between schoolchildren's musical knowledge and teachers' technology plan of musical activities.

At the same time, one of the most difficult and intractable problem is teachers' psychological readiness to changing educational paradigm. It is connected with overcome stereotyped attitudes, rethinking gained professional experience and new values adoption. That is a formidable task for teaching staff.

Results and Discussion

Since 70s of the twentieth century, computerization in musical education history can be characterized by two moments. Firstly, the program product was created mainly for demonstration of new computer capabilities as they were in need of practical development. Secondly, conducted experiments primarily pursued the aim to prove computer's effectiveness and practicability in teaching and learning music. They also were aimed at CBT popularization, as it was to win a certain position in of music educational system. Therefore, the main attributes of scientific articles have been both the technical descriptions of equipment and a list of computer training advantages over traditional training.

Most of the experiments carried out by then confirmed the effectiveness of new teaching and learning technologies. They also positively described computer usage practicability in teaching and learning music. In this regard, there was a change of priorities in further studies.

However, this trend has touched musical education almost in no way. Scientific experiments continue to be conducted in order to identify effective methods of computer use in education.

Only few scientific studies have attempted to rise above described individual techniques and experiments, to consider some of the common problems of musical education computerization.

Currently, there is an ongoing computer technologies' capacity increase.

Computer technologies usage for music composition alters the composer's thinking process.

It is experimentally proved that the effectiveness of training on musical subjects with the use of computer technologies increase, students' creative activity rises.

Computer programs can significantly educate ear to music and musical thinking due to their intense teaching and learning opportunities.

Schoolchildren's general musical education productivity enhance is achieved through implementation of structural-functional model of informative activity formation into teaching and learning process at music lessons by means of computer technologies: the target block, which defines the purpose, objectives, methodological approaches; inclusively procedural block — "Music and computer technologies in elementary school" methodical complex (author's curriculum on music for grades 1-4, methodological recommendations, electronic resource), organizational forms and methods system with the use of computer technologies; qualificatory performing block, which defines levels (creative, heuristic research- reproductive, reproductive), criteria (leaner-qualitative, cognitive, emotionally volitional, musically operational), indicators of schoolchildren's informative activity and the result (maturity of schoolchildren's informative activity by means of computer technologies at music lessons).

Further researches on this issue can be directed to computer programs development and testing in the matter of specific issues of vocal training for primary, secondary and higher level of general and vocational education.

Computer has firmly established in the music world, making a versatile musical instrument available for composer and performer. Therefore, there is an urgent need of computer technologies usage in musical education not only as a teaching and learning tool, but also as an object of study. In this regard, there is a new academic discipline in the curriculum of higher and secondary music schools – musical informatics.

Modern training program contents on music informatics rely mostly on traditional courses of computer science and computer engineering. To make music informatics course functioning, it is necessary to conduct additional studies, organize and summarize the information processes directly related to musical informational objects.

The main prospect of computer technologies usage is modeling of human activity. This applies to all kinds of musical activity, where computer technologies can be used: composition, performance, teaching and learning.

Conclusions

- There is a need to improve music teaching and learning technologies, to create music programs that would allow flexible and versatile using of rich traditional music teaching instrumentarium and musical computer capabilities as a professional tool of future specialist.
- Educational informatization process is one of the most important processes, one of the necessary conditions for successful development in teachers' professional development system.

- Today, the Internet is increasingly used in the solution of this problem. There are more activities associated with the use of modern network technologies to support teachers at the workplace, formation of teacher teaching community network, where teachers communicate with each other without leaving educational institutions.
- Information technologies development dictates the necessity of science-based intelligent application in education and professional practice in the field of musical pedagogy;
- Multimedia computers, including music-oriented with a broad range of capabilities, are becoming more common in various fields of professional activities.

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