Music Computer Technologies and the 'Soft Way to Mozart' System

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***Abstract*:** *Among the main objectives worked up by contemporary pedagogics in music, the authors focus their attention on the actual possibilities of digital technologies in enriching and enhancing the role of traditions that have been crystallized in practice of musical pedagogics for many centuries. The authors of the article analyze the problems concerning the current significance of contemporary musical notation, and, in particular, the ones being formed by the development of high-tech information environment, as well as the ways to solve some problems of learning music on the basis of music computer technologies using the Soft Way to Mozart system*

Keywords: *electronic musical instrument, keyboard electronic synthesizer, music computer technologies, musical education, 'Soft Way to Mozart' system*

1. Introduction

One of the main tasks of musicology today is to understand the functions of music both as an art and as a written language at a new level, to understand contemporary culture and cultural processes, and the influence of information technology on the formation of a creative personality capable of consciously perceiving various musical phenomena both directly and analytically and structurally. Research in the field of musicology, based on a number of interdisciplinary connections (philosophy, aesthetics, psychology, acoustics, neurology, semiotics, etc.) are directed today, on the one hand, to the study of culture, centuries formed in the history of mankind, on the other hand, to the study of the specifics of contemporary perception of music [1], [2].

The authors see one of the main tasks of pedagogical research in revealing the didactic features of the use of music computer technologies (MCT – see: [3], [4], [5]), the possibility of their application in the musical education and education of the younger generation on the basis of classical music, traditional approaches to the methods of transmission the products centuries-old musical culture. It is important that the passion for external, new digital effects and opportunities not only contributed to the bright and colorful "hot" impressions in communication with the art of music [6], but also developed critical thinking, worked on the development of intellectual and cultural growth of students, including the use of MCT.

2. Music Computer Technologies As A New Creative Educational Medium

High-tech information educational environment requires the search for new approaches and fundamentally new systems of education in the School of the Digital Age. The development of MCT in the late 20s – early 21st century has significantly expanded the ways of obtaining information.

The authors were guided by the general principles that had been developed at the Educational and Methodical Laboratory 'Music Computer Technologies', Herzen State Pedagogical University of Russia (Saint Petersburg) and the interactive learning system 'Soft Way to Mozart'.

Sphere of interests of the members of the 'Music Computer Technologies' Laboratory includes the problems of interrelation of natural and technical sciences and humanities, as well as the possibilities of applying the results of such interrelation for the purposes of music education and upbringing. Scientific group of the Laboratory also take part in working out the specialized software for computer music devices and in application of this software in pedagogical processes. Research activities of the members of Laboratory including such directions as:

- MCT in professional musical education (as a means to expand creative opportunities),
- MCT in general musical education (as one of the means of education),
- MCT as a means of rehabilitation of people with disabilities,
- MCT as the new direction in preparation of specialists of humanitarian and techno-logical profile,
- MCT in the field of digital arts,
- MCT in information technology, psychoacoustics and musical acoustics.

Developments and researches in the field of musical pedagogics and musicology, music computer science (musical informatics), computer modeling of processes of musical creativity, timbre programming, art of performing skill and arrangement on electronic musical instruments, creative work in the field of computer music, mathematical methods in musicology, etc. – all these directions in its totality allow to work up the methodological principles and pedagogical approaches to the use of MCT in musical education. (See: [7], [8], [9], [10] a.o.).

3. General Features of the 'Soft Way to Mozart' System

If The central part of the 'Soft Way to Mozart' system is specialized software, the necessary condition for the functioning of which is the connection with a digital keyboard musical instrument, carried out by means of a MIDI-interface. The components of the 'Soft Way to Mozart' system: specialized software, computer and synthesizer interconnection ([11], [12], [13]).

The choice of a keyboard instrument such as a clavier, a synthesizer, a MIDI-controller or a piano (in the 'Soft Way to Mozart' system we use digital keyboard instruments) was due to the crystallized traditions of classical music education. It is the keyboard that is able to convey the multi-voice palette of the musical fabric most accurately. Keyboard instruments have been the sound equivalent of a multi-voice sounding space for the last few centuries (see: [14], [15], [16]). Many genres of musical culture, are based on the use of scores, they are translated into the format of the clavier for wider use in the study of musical material and teaching IT.

The most important feature of the MCT is the possibility of direct and simultaneous interaction of not only all multimedia structures, but also the algorithm of interaction of these structures with human perception [17]. Digital media technologies have raised the process of both visual and auditory perception of the music stream to a new level: the level of a high degree of interaction ([18], [19], [20]).

There are general and specific features that we should consider when teaching any subject. General features are the foundation that form the entire structure of any subject. The alphabet in reading, the multiplication table in math, the globe in geography, the table of chemical elements in chemistry are examples of the general systems that unite more specific elements of each subject: letters, numbers, continents or chemical elements.

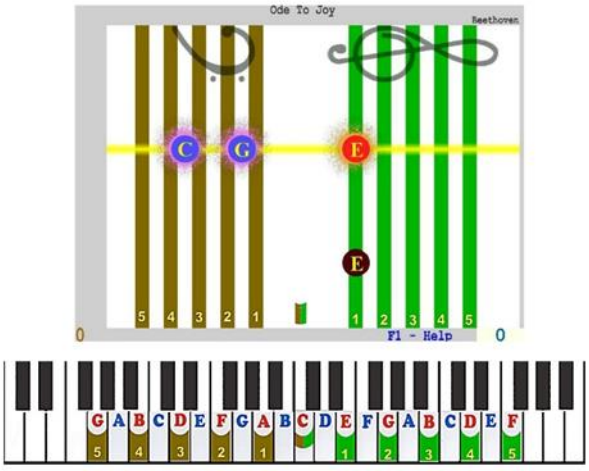
The following general fundamental features are essential for creating a whole system for music literacy:

3.1. Generally piano keys and Grand Staff are one unite

The keys are the lines and spaces, and the lines and spaces are the keys. They are a whole.

To learn the keys and lines/spaces separately is more specific.

The Piano geography, octaves, music notation are subtitles. They have to follow after the introduction to the entire unite.



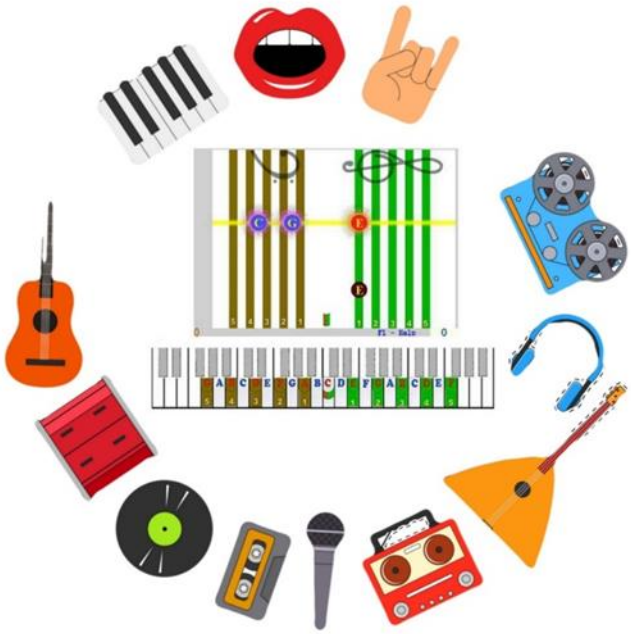
3.2. Pitch and placement on the Grand Staff are general. Timbres are specific.

All music sounds have concrete pitch and concrete placement on the Grand Staff.

Pitch and placement generally unite sounds regardless of their timbre.

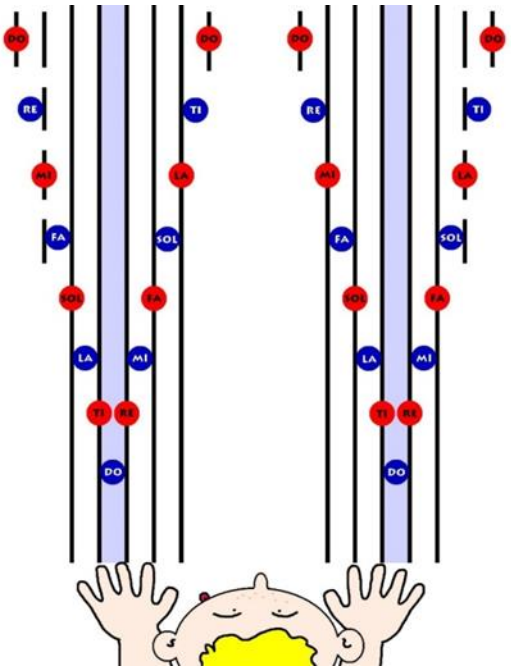
On the other hand, the timbres of music sounds are specific for each group of instruments and have no relevance to the music grammar.

Therefore, we have to start music lessons with piano keys and the Grand Staff to present music system as a whole first.



3.3. The Grand Staff is General–Treble, Bass and other clefs are specific.

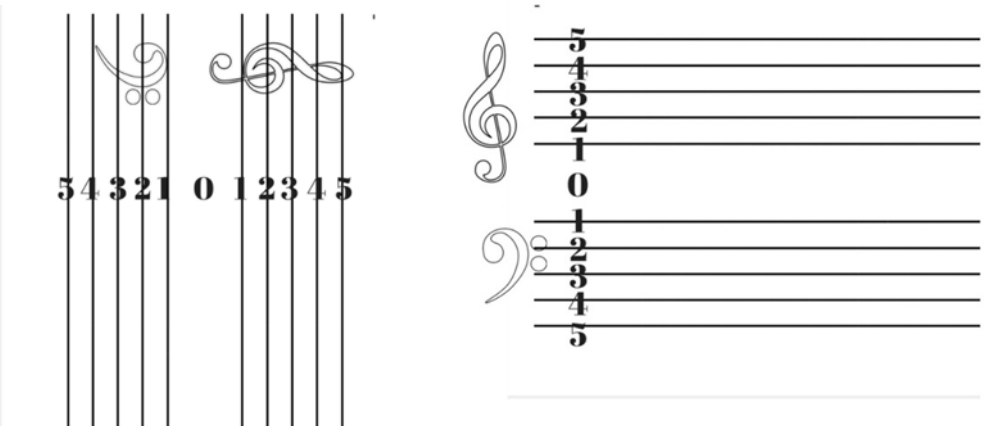
Treble Treble and Bass clefs are NOT two separate systems, but rather two parts of one system that mirror each other.



With this idea in mind, it makes more sense to count the lines of Treble and Bass from the Middle C, which acts like the 0 on a thermometer--with degrees going higher (to the right) and lower (to the left).

Based on this fact, we have to count the lines of the Bass clef not from the bottom up, but from up to bottom.

If your music textbook says otherwise, updated this information.



The Grand Staff is the general system of music literacy. We have to present it as a whole from the very beginning to avoid any confusion in the future.

Learning different clefs for different instruments is more specific. They can be introduced later after understanding the major concept first.

3.4. The duration of music notes is not a static form – it is a timing process.

The general feature of the process is that every sound has a beginning, a development and an end.

In this regard, the graphic representation of each note's duration is more specific element.

Here is an illustration:

A sound's beginning

The development

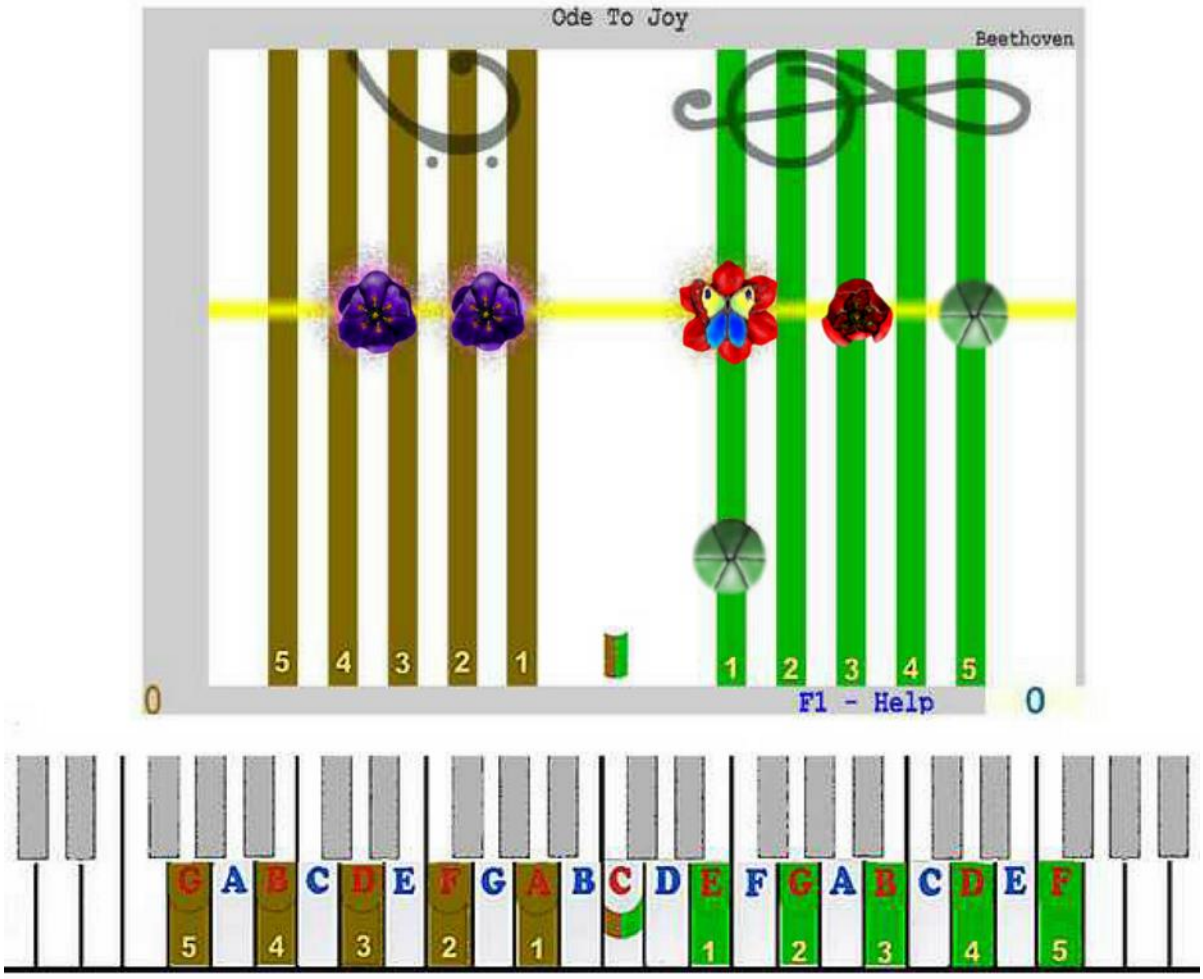
The end

Only interactive computer technology is capable of adequately communicating the beginning, the development and the end of the physical music sound ***in real time***.

For example, the touch of a key and a sound can be presented as an animated flower (for the beginning and the development) and a butterfly (the end and necessity to move on)

3.5. The time as one line of events.

One single line *generally* presents the moment of real sounding. It unites all sounds with no regard to their beginning, development or ending stage. Such line also unites all common elements of music - the pitch, lines and spaces (notes) and the keys.



The whole system of all music elements that received the name "Soft Way to Mozart" combines different forms of spatial expression of music into a single whole and in fact is an essential fundamental component for music education worldwide.

4. Conclusion

From 2013 to 2018 on the basis of educational and methodical laboratory Music Computer Technologies of the Herzen State Pedagogical University of Russia were conducted refresher courses for teachers of musical schools and boarding schools, and implemented the elements of the distance support program of excellence "Interactive Network Technologies Music Learning (the Program ‘Soft Way to Mozart’). Also in the educational and methodical laboratory Music Computer Technologies was organized music training on the basis of the educational system ‘Soft Way to Mozart’ for students of various (non-musical) faculties at the Herzen State Pedagogical University of Russia in the framework of the pedagogical experiment in the preparation of the master's thesis on the topic: ‘Information educational environment as a factor in the formation of general cultural competencies of students by means of the MCT’. Specialized software was installed with the support of the Resource Center of Informatization of the Herzen State Pedagogical University of Russia. In work with the students and the teachers were used visual, visual-animation and other interactive modifications developed for the ‘Soft Way to Mozart’ system.

Teachers who have successfully studied up the program, mastered the competencies, including the ability (and willingness): to use interactive network technology of music training in educational activities; to develop training and presentation materials for classes using the MCT and interactive network technology of music training; to conduct classes using contemporary MCT and interactive network technology of music training; to possess the skills of teaching music to people with disabilities through the use of MCT and interactive network technology of music training; to be able to create the most effective environment for the development of musical and creative abilities of children; ability to apply contemporary methods and technologies of organization and realization of educational process at different educational levels in various educational institutions; ability to develop and implement educational programs to promote scientific knowledge and cultural traditions; ability to create artistic and cultural environment etc.; as well as ability and willingness to apply rational methods of search, selection, systematization and use of information; orientation in the produced special educational literature on the profile of training and related issues, to analyze various methodological systems and formulate their own principles and methods of training ([21], [22]); willingness to apply contemporary methods and technologies, methods of diagnosing the students' achievements to ensure the quality of the educational process [23].

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She was on a number of business trips abroad, among them working trip to the USA (1999); lecturing and giving research and practice seminars in Hungury (2003, 2005, 2017); business trip to the UK (2016); she was a member of the Jury of national and international competitions of musical creativity, including *Bridge of Friendship* (Dortmund, Germany, 2011), etc. Work experience; 1990 – 2010 - Associate Professor, Professor of the Department of Information Technology of the Herzen State Pedagogical University of Russia, St. Petersburg; 2010 - present - Full Professor of the Department of Information Technology, Institute of Computer Science and Technological Education of the Herzen State Pedagogical University of Russia, St. Petersburg; 2002 – present - Chief Researcher of the Educational and Methodological Laboratory *Music Computer Technologies* of the Herzen State Pedagogical University of Russia, St. Petersburg. She has more than 300 scientific publications, among them are monographs *Music Computer Technologies: Historical-Theoretical and Practical Aspects*, St. Petersburg: Publ. house "SMIO Press" (2007, *560 pp.*) and *Music Computer Technologies: The*

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Prof. Dr. Gorbunova is Chairman of the Organizing Committee of the international research and practice conference *Contemporary Music Education*, Chairman of the Organizing Committee of the international research and practical conference *Music Computer Technologies in the System of Contemporary Education.* Dr. Gorbunova is a member of the Jury of national and international competitions of musical creative works, including *Electronic Palette* (Saint-Petersburg), *Music and Electronics* (Moscow), *Music of the XXI Century* (Moscow / Saint-Petersburg), International Festivals and Competitions *Musical Electronics and Multimedia* (Moscow / Saint-Petersburg), *Clarine of the XXI Century* (Saint-Petersburg), *The World of Art without Borders* (Saint-Petersburg, Russia - Szeged, Hungary), *Bridge of Friendship* (Dortmund, Germany), All-Russian Competition of Electroacoustic Music *DEMO* (Saint-Petersburg). She is a member of Editorial Boards of International Journals: *Music Scholarship / Problemy Muzykal'noj Nauki* (SCOPUS), *The World of Science, Culture, Education / Mir Nauki, Kul'tury, Obrazovaniya*, Electronic international scientific journal of music and sound in electronic mass media, film, Internet, and multimedia *MEDIAMUSIC*. Prof. Dr. Gorbunova has developed first ever course in Music, called Music Computer Technologies, which has been offered under the Bachelors of Arts and Sciences (BASc), , which in 2004 carried out student recruitment in different regions and educational institutions of Russia and she also leads post-graduate courses "Music Computer Technologies in Education" available under the MA in Music Education, since 2006. Prof. Dr. Gorbunova supervises a number of doctoral and post-doctoral students (more than 30) and lectures on Music Computer Technologies and Information Technology in Music. She supervises research in various directions, among them there are: *Theory and history of culture, Music Art, Information system and processes, Theory and methodology of professional education, Mathematical modelling, numerical methods and program systems, Theory and methods of education and upbringing (in Music, Informatics, natural sciences)*. The research results of Prof. Gorbunova were published in over 300 refereed publications including 48 books and 255 papers in journals and conference proceedings. Awards and honors: 2003 - Gold medal of the all-Russian Exhibition Centre (former VDNKh); 2005 - Silver medal of the all-Russian Exhibition Centre (former VDNKh); 2009 - Gold medal of the all-Russian Exhibition Centre (former VDNKh); 2009 - Diploma of the winner in the nomination «New educational technologies in ICT environment» of the all-Russian creative contest of scientific-technical solutions, educational products and services in the field of Informatization of the innovative-educational complex «Music computer technologies in the system of modern education»; 2010 - Grand Prix of International Congress-exhibition «Global Education - Education Without Borders»; 2010 - Diploma of the 11th all-Russian forum «Educational environment - 2010» for the project «Digital educational resources «Music computer technologies in education» in nomination of «Creative Competition of scientific developments, innovative solutions and programs in the field of higher vocational education» and many others; 2011 - Laureate of the Prize of the Government «For Outstanding Achievements in the Field of Higher and Secondary Professional Education»; 2013 - Honorary Worker of Higher Professional Education of the Russian Federation.

Hellene Hiner. Author and the other authors may include biographies at the end of regular papers. This author became a Member (M) of URUAR The first paragraph may contain a place and/or date of birth (list place, then date). Next, the author's educational background is listed. The degrees should be listed with type of degree in what field, which institution, city, state or country, and year degree was earned. The author's major field of study should be lower-cased.

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