

# About The Music Training Program Using Music Computer Technologies, Designed for Teenagers Who are Passionate About The Exact Sciences

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**Abstract**— Since music teaching is intended for teenagers involved in exact and natural sciences, a number of subjective and objective reasons require systematic adherence to the plan of each lesson in music teaching. This is due to the peculiarities of thinking of teenagers who are deeply involved in such disciplines as physics, mathematics, and programming. In addition, the usual form of training is important, requiring maximum clarity, constructiveness and systematic presentation of the material. Teenagers understand that training in a creative profession can be carried out in a way that is understandable to them.

**Keywords**— Electronic musical instruments, music computer technologies, playing the electronic musical instruments, music therapy.

## I. INTRODUCTION

Music classes occupy a special place in the learning process of schoolchildren involved in the exact sciences. Let's consider this process, which was implemented during the summer holidays using music computer technologies (MCT). We investigated this aspect in the process of introducing into the educational context a specially created program for teaching music to teenagers involved in the exact sciences during their stay at a summer camp. As music computer technologies, software and hardware systems were used for creating computer music, digital sound processing, musical acoustics tools [1] and a digital musical instrument (or, as is now commonly referred to as "electronic musical instrument"). In our opinion, it is training in the summer that creates a convenient teaching and educational environment for the implementation of this program. Then the methodology of teaching music was tested in the process of conducting a

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pedagogical experiment, determined by the need to provide musical training to secondary school students.

## II. THE MUSIC TRAINING PROGRAM, DESIGNED FOR TEENAGERS WHO ARE PASSIONATE ABOUT THE EXACT SCIENCES

As the basis for such a program, we took pedagogical concepts developed in the Education and Methods Laboratory *Music Computer Technologies* of the Herzen State Pedagogical University of Russia, in which the fundamental principles of interaction of various research concepts that are interdisciplinary in nature are most clearly visible (see, for example, in works [2-8]) and aimed at creating an educational program for students that could provide a motivated approach to the acquisition of knowledge, on the one hand, already formed by children studying in physics and mathematics classes and classes with in-depth study of computer science and programming, on the other, could become an effective basis for their comprehension of the humanitarian subject area (music) [9-11]. Also, in the features we identified for constructing an educational program for teaching music using modern music computer technologies, breakthrough educational technologies and opportunities for creating a special learning environment for children with developmental disabilities and disabilities were identified (see more details, for example, in [12-13]), which led to a separate route for the development of a new educational program for teaching music to teenagers specializing in teaching the exact and natural sciences.

Based on the results of preliminary diagnostic studies, we identified the following criteria for the development of musical creative abilities of adolescents in a summer computer school:

1. Manifestation of musical creative associativity - finding similar features in different definitions or terms.
2. Demonstration of flexibility in creative thinking.
3. The desire for independence in making creative decisions.
4. Refinement of details in order to improve the original concept.
5. Inclusion of new knowledge into an existing system of skills.

The lesson plan was formed from four forms of work necessary to most fully prepare teenagers for creating music:

1. Music theory
2. Composition
3. Playing a synthesizer - a digital musical instrument or electronic musical instruments.

#### 4. Listening to music

Since music teaching is intended for teenagers involved in exact and natural sciences, a number of subjective and objective reasons require systematic adherence to the plan of each lesson in music teaching. This is due to the peculiarities of thinking of teenagers who are deeply involved in such disciplines as physics, mathematics, and programming. In addition, the usual form of training is important, requiring maximum clarity, constructiveness and systematic presentation of the material. Teenagers understand that training in a creative profession can be carried out in a way that is understandable to them.

The first form (music theory) in content is a combination of elements of solfeggio and elementary music theory. Music theory is taught without an instrument and involves the study of musical notation, musical terms, and ways of writing musical fabric. Music theory includes many different branches of music science, among which are solfeggio, elementary music theory, harmony, polyphony, forms of musical works, orchestration, musical acoustics and psychology. To work on musical notation, we used the music editor Sibelius - a computer program designed for typing music text.

### III. THE PLACE OF THE DISCIPLINE "MUSIC" IN THE STRUCTURE OF GENERAL MUSIC EDUCATION

The place of the discipline "Music" in the structure of general music education

The experimental music training program is designed to develop the creative potential of teenagers engaged in the exact sciences, and its content correlates with general educational programs in the field of arts.

The program is based on the principle of variability for different creative preferences of teenagers, ensures the development of musical creativity, forms a steady interest in creative activity, develops in the field of music and computer technology.

The content of the music education program is closely related to the subjects "Solfeggio," "Elementary Music Theory," "Listening to Music," "Musical Literature," "Musical Composition," "Musical Instrument" and contributes to independent further development, continuing studies at a music school, as well as possible admission to specialized music colleges.

In order to attract the largest number of teenagers to music education, to ensure the accessibility of music education, the implementation period of the general development program in the field of music education is an academic year.

The program defines the content and organization of the educational process, is aimed at developing musical creativity, creating the basis for them to gain experience in creating musical compositions, arranging music, creating musical acoustics of playing on a synthesizer and midi keyboard thanks to musical and computer technologies, and independent work on studying and comprehending musical art.

The content of the program ensures the development of intellectual and creative abilities of a teenager, significant for education, socialization and modern society of the younger

generation, the development of his personal qualities and musical and computer skills.

The amount of study time provided for in the curriculum of the music education program:

Duration of the course is 1 year.

Number of hours per classroom load is 72.

Weekly classroom load 2.

The form of conducting classroom training sessions:

small group (8 - 12 people on average), the recommended lesson duration is 45 minutes.

Classes are held once a week for 2 academic hours.

Goal:

achieving a certain level of development of knowledge, skills and abilities in the field of music composition by means of music computer technologies

formation of students' skills in creating a musical composition;

□ perception skills of classical and modern classical music.

Tasks:

- to identify the musical creative potential of the student, to encourage and develop his musical imagination in conditions of maximum creative self-expression with the help of music computer technologies;

- to create a comfortable creative atmosphere for the most effective development of creative potential;

- to give an idea of elementary music theory and musical form;

- contribute to the understanding of musical works;

- to master music computer technologies for further independent creation of musical compositions, arrangements, sound engineering activities.

Forms and methods of control: goals, types, form, content.

The assessment of the quality of the implementation of the music training program includes the ongoing monitoring of academic performance and the final diagnosis of the participant in the experiment. The process of developing the musical creative potential of adolescent students is carried out using methods of observation and conversation. In addition, communicative, search, and research methods are used. The intermediate and final control of the subject is carried out in the form of an anonymous questionnaire with closed questions.

Forms and means of current control.

Demonstration of fragments of essays is used as a means of current control. During the control lessons, written essays are demonstrated, varying in size and technical complexity, depending on the level of training of students.

Approximate requirements for intermediate and final control:

1) Composing a small work in a simple 2- or 3-part form for piano or other solo instrument (duet or trio is possible) in the form of recording musical material in the Sibelius music editor.

2) composing a program or genre work (waltz, march, prelude) in Cubase using audio editors and the introduction of sound special effects and electronic sound elements with further playing (partial or complete) compositions on a synthesizer (electronic (digital) musical instrument).

### IV. CONCLUSION

The development of the creative potential of high school students and adolescents involved in exact and natural sciences can be significantly updated in the process of teaching them

music according to a program based on modern educational technologies and music computer technologies [18-21]. In addition, we identified the positive impact of music education on the development of creative potential in the process of interviewing a wide range of teachers during participation in conferences at the all-Russian and international levels, the topics of which were aimed at identifying key directions for the development of contemporary both musical and general education of adolescents.

The issues raised in this article are widely covered today during scientific and practical conferences, seminars, master classes, and creative competitions at various levels, which necessitates further research in the chosen direction.

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