THE POSITION OF MUSIC COMPUTER TECHNOLOGIES IN INFORMATICS COURSE FOR SECONDARY SCHOOL

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Abstract - The article raises the actual problem of contemporary process of teaching Informatics at school – search for the best tools and techniques for school`s information science in the audiovisual sector. The analysis of relevant existing instruments (current and near future projects). Do the facts justify the expected positive effect of the application of music computer technologies to teaching informatics in secondary school (as a general-education subjects). As an organizational and methodological resource authors propose the idea of development of electronic textbooks for music by students themselves. Displaying students performing educational projects using various subclasses selected by the authors of music computer technologies (MCT). The authors also give a number of examples of pedagogical experience in the areas of research identified in the article. The authors conclude: the teaching of computer science using the MCT at secondary school relevant as an opportunity to find a student's creative response to the process of digitalization of culture, secured a high level of educational motivation of the student and other.

Keywords - AudiovisualIinformation, Educational Project, General Education, Informatics, Music Computer Technologies (MCT)

I. INTRODUCTION

The phenomenon, which earlier (2004, I. Gorbunova [8]) was named as music computer technologies (hereinafter – MCT), has become widespread in educational prac-tice, primarily at the level of higher education (in a number of universities in the United States / Stanford University, Harvard University, Berkeley University &oth., England / Centre for Digital Music Queen Mary, University of London &oth., France / Institut de Recherche et Coordination Acoustique/Musique&oth., Germany / University of Cologne &oth., Austria / University of Vienna &oth., Italy / UniversitàdegliStudi di Milano &oth., Czechia / Academy of Performing Arts in Prague, Russia / Herzen State Pedagogical University of Russia, &oth., etc.), including professional music education (for examples, see [7]).

At the same time, these technologies (MCT) open up significant prospects also for their use in secondary general education, namely, the inclusion of their development in the school course of information Sciences. Such educational prospects are due to the fact that:

a) contemporary student has the opportunity to use the hardware and software base of technologies (on the whole – IT, in particular – MCT), placed or installed on a per-sonal smartphone [9];

b) MCT in terms of technology are a phenomenon that is a special case of information and communication technologies (for example, a student using MCT-soft performs operations: file recording, copying and editing-changing individual parameters: volume, duration and others), where the music material is a sphere for the implementation of algorithmic competencies of the user at different levels (on the 1st – subject, on the 2nd – attribute, on the 3rd – logic-algorithmic, on the 4th – creative [20, p. 106]);

c) from the viewpoint of culture theory MCT are a phenomenon of music broad-casting (its content in a ready-made form), and they are a phenomenon that allows the student to realize himself/herself in the audiovisual sphere through various directions of his/her work (singing, playing a musical instrument, dancing, creating illustrations for music &oth.) [6].

II. FROM EXPERIENCE

2.1. Discovered Arguments for the MCT Using in the School Course of Informatics

A number of studies add to the list of additional weighty arguments for the use of technology (MCT) in the school course of Informatics:

a) children aged 6–12 years show the best results in tests on all core competencies in cases of using integration for music education together with basic subjects of secondary school (mathematics, mother tongue, foreign language, etc.) [4];

b) the music is able to facilitate an individual in his/her socialization and communication in a multicultural community; including, researchers observing in humans:

- increase in the level of his/her empathy towards this culture and its representatives [21];
- having a pan – cultural emotional understanding of what music conveys with its content through an artistic image [2];
- higher social positioning, significant progress in the formation of identity, especially when using a complex that includes visual, auditory, gesture perception [19];

c) the effect of subjective well-being (SWB) is observed much more in those who actively communicate with music (dancing, singing, etc.),

unlike those who are not engaged in these activities [23], also-the use of gadgets (for communicating with mu-sic) allows their owners to be not passive listeners, but become active consumers [10].

2.2. Arguments of Technology Development in the School Course of Informatics

The need for pedagogical resolution of a very topical problem actually causes the inclusion of skills in mastery of MCT in the course of school Informatics.

This problem lies in the contradiction in which:

a) on the one hand, firstly, with regard to the included learning content, "Audio establishes a new type of learning space: one full of social presence, unconstrained by time or place. It provides an additional space <...>, it can also mediate new types of learning activity, develop and relocate existing activity, and support the review of class activity" [11];

b) here, secondly, with regard to the moment of beginning for the development of these technologies, students (their main part) demonstrate a sufficient level of social identity (this is expressed in the selection of the most typical musical works and pop music performers) precisely to adolescence [3];

c) on the other hand, most parents and teachers (and even youth representatives) are critical of pop culture content (including, and expressing it in a rather radical form – [22], etc.).

It is not possible to eliminate the above (see above – p. 2.2: a–c) contradiction only by providing devices for schoolchildren or only by teaching the student the skills of using this (MCT) material and technical base, because:

- firstly, as the observations show, modern teenagers (and even younger children) often master some ICT tools on their own, but are not able to reflect the algorithm of actions that would give them the opportunity to work with other similar applications (another developer and / or in another OS);
- secondly, studies show that "material conditions do not necessarily correlate with changes in practice and with pedagogical results" [1]).

2.3. The Main Tasks of School Informatics (Audiovisual Sector). An Idea of Their Solution

Tasks for school Informatics in the audiovisual sector.

The main tasks for school Informatics in the audiovisual sector, in our opinion – are the Trinity, which includes such components:

a) motivation of the student to work, interesting and necessary, first of all, for him-self/herself;

b) technological training of the student, consisting not of the development of individual operations, but of the assimilation of the algorithm of action, which contains the meaning of these operations (for example, on / off the device; switching equipment; performing actions to save information / correction, etc.) to work with different subclasses of software (MCT-software: "players", "recorders", "editors", "electronic musical instruments", "multimedia-complexes", "music editors", etc.), that will allow to withdraw further and on the level of creativity [16, pp. 69–75];

c) expansion of the cultural horizons of the student, including the acquisition of pedagogical support for them that is considered to be useful critical experience, which is to analyze the artistic value of a particular work of art, in the analysis of its individual constituent elements (video, text comments, sound track) [13, pp. 31–32].

An educational project 'Electronic textbook'

We propose the following idea to solve these (see above – p. 2.3) tasks: an education-al project, in which the student creates separately own elements of an electronic text-book (electronic pages; musical examples, selected by his/her own choice; illustra-tions created by his work, etc.), implementing separate stages of development and multimedia and hypermedia technology (choice of theme and method of implementation; design of object / resource; implementation of the object / resource; representation of the work performed; use of object / resource for learning [24, pp. 72–73]).

One of the experiments on the introduction of teaching using the MCT in the course of school Informatics was carried out by the authors of the article in 2010–2017 in secondary schools of Irkutsk and St. Petersburg. The pedagogical experiment directly involved students in the Parallels of 5–8 forms (1143 students).

III. CONCLUSIONSAND FURTHER RESEARCH

3.1. Criteria of Teaching the School Informatics with MCT

The success of the proposed training option (using the MCT) was monitored by the following criteria:

a) MCT-product (works, made using MCT and receiving peer-reviewed) [14, pp. 182–187];

b) ICT-competency levels [14, pp.198–200], defined on the basis of the systematization of the requirements for students' media training (D. Leveranz – [5, pp. 157–162]);

c) level of motivation for learning (learning motivation; N. Weicker – [18, p. 341]).

3.2. The Results of a Statistical Processing According to the Experience

The results of the statistical processing [12] carried out (by the method of determining the sample average, t-student test) for the data obtained during the experiment, con-firmed the effectiveness of the use of MCT in the course of teaching computer science /Informatics in secondary school (several special cases exceeding the norm for pedagogical

research in t < 0.05, due to organizational shortcomings or problems).

3.3. The Place of an Electronic Textbook and the Teachers` Participation in the Project

Similar electronic textbook (see p. 2.3):

- on the one hand, is able to represent in the audiovisual sector which is not the only educational area, but different areas: "Art: Music", "World Art Culture", "Literature and Language" (native or foreign), "History", actually "Informatics" &oth. [17];

- on the other hand, as a product of the activities carried out by a particular student, provides an opportunity to monitor the activities of the educational process [15, pp. 189–191].

Possible distribution for the participation of teachers who accompany the student in the implementation of the educational project:

- the teacher of a particular subject takes a fundamental decision on participation in such a project (the choice of the implementation of the technological part of the training, which determines the choice of the motivation vector – see p. 2.3: a); he/she also organizes, advises, monitors the process of selection of the actual material by the student (see p. 2.3: c);

- Informatics teacher – or as the only (for cases of realization of the project in the educational area "Computer Science") is the organizer of technology (see p. 2.3: b) training, or as the main consultant for teachers and other educational fields (for events not on the school subject "Informatics", but, for example, in music, in literature, on some others) in matters of technological learning.

3.4. The Main Conclusions about Teaching Informatics with Using MCT

As a result, we can recognize the teaching of computer science using the MCT (for example, by creating elements of an electronic textbook) at secondary school:

a) relevant, on the one hand, as a reflection of the vector on the informatization of education and on the informatization of other spheres of our contemporary life; on the other hand, as an opportunity to find a student's creative response to the process of digitalization of culture;

b) secured, on the one hand, a high level of educational motivation of the student (Hawthorne effect does not have enough weight, because it is much inferior to the motives of self-realization); on the other hand, the hardware and software base (for example, a personal smartphone), available to him;

c) effective, on the one hand, in relation to the ICT-competences formed in schoolchildren; on the other hand, as one of the ways of creative self-realization of a teenager.

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