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Music-Related Educational Project for Contemporary General Music Education of School Children

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This article discusses the problems with the use of ICT tools (including MCT tools, described by the authors) for the development of school children in contemporary general music education. The authors know that ICT tools are needed and are one of the main trends in general music education at the present stage of development of both society and technical means. These tools are instrumental in support of learning and the process of self-education on active types of musical activity (singing, playing musical instruments, composing, recompiling music, etc.), in fostering creativity, and in subjects indirectly related to music (theatre, choreography, creation of illustrations, music videos, etc.). The manuscript describes the experience of teaching school children through the training they have associated (indirectly or directly) with the music of the educational project. The authors present the following to the readers: the research base, categories of participants, conditions, scenarios of participation, the essence of the content (educational topics) mastered by school children and assessment tools used. The conclusions regarding the prospects for using the proposed means of general music education are based on an analysis of the statistical data of the conducted experiment and on a holistic analysis of interconnected pedagogical, sociological, technological and psychological factors.

Key words: *Creativity, Educational Project, General Music Education, E-Music, Music Computer Technologies (MCT)*

Introduction

In the twenty-first century, mankind has at its disposal information and communication technologies (ICT) that together make up a tool with which to pursue modern human activities

in virtually any field at a new level; a tool that is becoming ever more pervasive in all spheres of life: personal, social, educational, professional, health care, etc.

The authors distinguish a specific section in ICT that is materially and technologically connected with the creation of music, with various other methods of interaction which are designated as “music computer technologies” (Gorbunova, 2004). This particular attention to these technologies is explained by the following:

- On the one hand, by the authors' type of professional-pedagogical and scientific-pedagogical activity;
- On the other hand (and this should be deemed as the primary reason), by the educational potential of music, including:

- First, the self-realisation of a person through a variety of musical creativity — singing, composing music, playing musical instruments, conducting, etc., and also through the ways of creative self-realisation indirectly related to music — choreography, theatre, cinema, etc.;
- Second, the ethical and aesthetic experience transmitted from one generation to another and packaged in musical culture - in all the diversity of folk traditions, historical styles, musical trends, genres (Adorno, 2014);
- Third, a particular, irreplaceable musical communication (on the emotional, cognitive, transcendental levels): on the one hand, between performers like orchestra musicians, singers in the choir, etc.; and on the other hand, through a musical work between the author, the performer and the listener (Hargreaves et al. 2005);
- Fourth, a unique international language of music, accessible for people of different ages to understand and even master.

The following facts confirm the significance (status) of the MCT:
- MCT elements, as an academic discipline, are taught in many educational institutions of the world: Centre d’Etudes Mathématiques et Automatique Musicales (founder - J. Xenakis; France, Paris); the Center for Computer Studies of Music and Acoustics at Stanford University (USA: Stanford); the Center for Music Experiment at the University of California (USA: San Diego); the Scientific Creative Center of Electro-acoustic Music (until 2006 - Computing Center) in the Moscow State Tchaikovsky Conservatory; the Educational and Methodical Laboratory for Music Computer Technologies in Herzen Pedagogical University (Russia: St. Petersburg); and others .

- Music programming elements are taught to musicians in the UK (the University of Hertfordshire, the University of Salford, Access to Music Ltd., Bedford College), in Germany (Institut für Musik un d Akustik / Zentrum für Kunst und Medientechnologie); in the USA

(branches of the University of California, Stanford University, New York University, Full Sail University); and in Russia (Saint-Petersburg University of the Humanities and Social Sciences), etc.

The authors view MCT not only as a technical means ('computer-based technology', 'music technology', 'sound and music technology', 'electronic and digital music technology') (Pinch & Bijsterveld, 2003), but much more broadly as a phenomenon of pedagogy in the aggregate of technological, cultural and didactical aspects ('music education with technology', 'music education with digital technology') (Finney & Burnard, 2007; Gorbunova et al., 2018; A.R. Brown, 2015).

It is important to note that both ICT and MCT (like any other tool) have, on the one hand, the potential that provides the user with new opportunities, but, on the other hand, they contain risks (both explicit and implicit). That is why the authors see it as one of the tasks of pedagogical science and as the goal of this research (content of this article) in identifying the conditions under which any modern schoolchild can use the potential of ICT and MCT for their musical education, but at the same time avoid risks associated with these technologies.

Literature Review

Presentation of the Subject of the Analysis and the Main Trends in This Phenomenon

The materials included in the analysis aiming to identify and compare the traditional and innovative (specifically those using ICT and MCT tools) approaches adopted in the organisation of music education are briefly outlined below:

- Scientific literature devoted to the problems encountered when teaching music methodology, musical psychology, psychology of creativity, sociological research in the field of music education, etc.

- Transcripts of interviews conducted with practicing teachers who work with school children in primary and basic general education settings, or in supplementary, special music and higher education

When analysing this data, authors of this study relied on their pedagogical and scientific experience. Findings yielded by these analyses revealed that:

a-1) Prior to the informatization era, scientists and practicing teachers (such as Orff, Jaques-Dalcroze, and Kodály, among others), were of view that successful general music education is achieved primarily through the introduction of younger children to active types of musical

activity, such as singing in a choir or playing music (both individually or in an orchestra) (Rowe et al., 2017)

a-2) Due to its practical orientation, general music education is inevitably interrelated with primary pre-vocational music education/additional education (including activities undertaken during school summer holidays)

a-3) As the digital age increasingly requires adoption of new strategies, such as 'peer-based learning', 'do it yourself learning', and 'e-learning' (Dillenbourg, Baker, Pappas, et al., for example, http://www.openuniversity.edu/resources/music-education), 'blended learning environment' is likely to be adopted in music education as well (Graham, Launer et al.);

b-1) The specificity of modern general (and special) music education is expressed in the use of various electronic instruments that allow for:

- Playing electronic (including virtual) musical instruments, synthesizers, drum machines, etc.)
- Recording sound (using recorder applications), including the process of performing a musical work (via video recording programs)
- Editing audio and video recordings (using audio and video editing applications)
- Depicting the sound graph notation (in musical notation or through other forms, such as 'tutorial piano', etc.)
- Decoding the recorded material in digital form to obtain the original sounds (including new timbre colours by, for example, referring to the MIDI format, etc.)
- Connecting media resources and multimedia instrumentation (O'Neill, 2014);

b-2) Introduction and distribution of electronic tools in music education suggests that a number of new scientific categories have been introduced in pedagogy to denote this novelty. Some notable examples are 'i-Music' ('i-Music Education', coined by Chong (2012), and 'e-music' (referring to music with the characteristics of an activity in the process of its creation, perception, etc., which imposes on it the computerisation of the data fields; see for example (Gorbunova and Plotnikov, 2018);

c) Considering the new possibilities for using electronic tools, national standards are already being developed in many countries (Australia, England, Singapore, Russia, USA, etc.) and are being applied to this field of general education (for example, https://www.nationalartsstandards.org/, https://nafme.org/my-classroom/standards/core-music-standards/, etc.). It can be noted that the development and introduction of these standards differs both across countries and among the various stages of implementation, ranging from statements of intent and local experiments to full-scale connection of all participants in educational activities (development and operation of advanced training courses for teachers,

creation of educational resource centres, databases and others—at the state level or at the level of individual institutions, closed or open, paid or free)

d) Scientists are increasingly exploring the pedagogical implications of using ICT in general music education, as well as its social consequences (for example, Benedict et al., 2015), and effects on psychological problems (Breeze, 2011; O'Neill, 2014).

Positive and Negative Manifestations in the Implementation of ICT Tools

Several positive (or neutral) aspects emerged from the analyses focusing on the use of modern technical equipment (ICT, MCT) in general music education at the middle and high school level, as outlined below:

- Consideration of student age and other characteristics (a) and the balance between various types of musical activity (b) allows for including tablets at any stage of the lesson, which can be used both at school and at home, because "through them, new content can be intuited, certain competencies can be practiced, desired musical skills can be developed" (Muntean, 2017, p. 27);

- "Digital tablets are not a barrier for the academic performance of students, but a tool that helps in the teaching-learning process" (Guillén-Gámez et al., et al., 2018);
- The use of gadgets (for communicating with music) allows their owners to be not passive listeners, but become active consumers (Krause et al., 2015);
- 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 (Weinberg & Josep, 2017);
- A higher level of emotional empathy in the artistic image of a musical work is observed in cases of "live" performance as compared with the perception of music in audio and video recordings (Coutinho & Scherer, 2016);
- "Composing (and other musical creativity) as a dual act an act of formulating identity and a musical act of assertion" (Hess, 2019);

- For elementary school children "a vocal singing a crucial element in music education (acting as means, resource and content of education), and its rhythmic and harmonic support through traditional or electronic instruments turned out to be appropriate, ensuring a positive, efficient, and dynamic learning atmosphere and providing great satisfaction" (Pop-Sârb, 2016). This fact determines the basis for the method of teaching music at the previous stage - in elementary school, but one cannot abandon this method when working with adolescents; as negative manifestations (those containing threats).

- The appearance on the Internet of a large number of audio and video recordings, written manuals on singing and online masterclasses prepared insufficiently competently or illiterately that M.V. Budoiu estimates very categorically: “talking about the shifting of the taste for the athletic approach of voice seems obsolete and superficial – one detail only in the large context of the much greater and more urgent danger of the total lack of real reference points in the pseudo-pedagogy of singing in the 21st century” (Budoiu , 2018).

- The fact of expansion of the paid sector in non-formal music education, C.T. Overland warns: “the for-profit paradigm does very clearly bring issues of socioeconomic class and justice to the table, in which access to certain types of artistic education become restricted to those of a particular demographic. Should private PME schools continue to grow in popularity, they may inadvertently recreate the class hierarchy public music education has spent decades trying to avoid” (Overland, 2017). Bates (2018) agrees with that statement (Radhy, 2019).

In general, a comprehensive analysis confirms the conclusions we reached earlier - the most important factors for general music education at the middle level in secondary school, which must be considered when organising educational activities:

- ICT (MCT) contain both positive potential and many threats for school children;
- “Technological mechanisms for the implementation of creative (music and/or music-related) activities of a schoolchild from using the advantages of modern ICT tools do not solve educational and artistic issues” (Gorbunova, 2016).

The Research (‘Music-Related Educational Project’)

The Basis of the Study (the Idea and the Hypothesis)

The idea of this research is based on the following:
A) On the use in general music education of such a form as an educational project (connected directly or indirectly with music, that is, an example of the work recorded by the student: vocal, instrumental, dance, theatrical and other versions of a particular musical work) performed by a teenage school student in order to implement own individual educational route, besides - serving the purposes of monitoring educational activities (according to the sectors designated in Map of Musical Development) (Gorbunova & Hiner, 2019);

B) On all of the benefits that the authors identified and offered:

- “Actual possibility to create the product bank of MCT's materials created and used by students;
- Advantages of digital forms of information (convenience and reliability of storage, copying

without loss of quality, quick search, quick access to the materials, and so on);
- Lack of technological and psychological drawbacks that are in the greatest user comfort mode (audio recording of their <work>);
- Opportunity to carry out a reflection of the work performed by an adolescent and/or an adult whom (s) he trusts;
- The transition to training and education through the development of the adolescent Educational Progress self-assessment skills" (Gorbunova & Zalivadny, 2018);

C) On the diversity of the topics when making up such a class project ('Name', 'Theatre', 'Music Typewriting', 'Ringtone', 'My Profile', 'Greetings from another country', 'My World', 'Mini film about music', 'My music is for you', 'Palindrome', 'Orchestra', 'Choir', 'Multitrack' and others);

D) On the experience of the implementation of the European educational project "Erasmus" ("Soundcool" system), in which three of the five components of the hypothesis are identical to our forecast (Research Hypothesis) - teaching music, which is done through the implementation of a school project related to the adolescent student:

- "Removes barriers between different musical styles and genres;
- Promotes collaborative musical creation contributing to place the student at the centre of the educational process;
- <...> Increases student motivation" (Carrascosa Martínez, 2017).

Research Methodology

Research Base

The study was conducted in one of the secondary schools of Irkutsk, which is the administrative center of the Irkutsk region (located 60 km from Lake Baikal) with about 620 thousand inhabitants); up to 2,000 people of 6–18 years study at school (from the 1st to the 11th grade; receiving primary, basic secondary and full secondary education).

Participants of the Experiment and Conditions of Participation

The authors offered participation in the experiment to all school children on the parallels of the 5th, 6th, 7th grades, while 8th graders completed at least one task in each of the 2 academic half-years (according to the school curriculum, there is 1 academic hour for music lessons per week, from 1st to 8th grade inclusive, each of the school years contains 34 hours).

Content Mastered by School Children in the Course

In the 5th grade, school children study the general theme “Centuries Sing” (genres of vocal music, including musical and theatrical genres), in the 6th grade they study the theme “Centuries Play” (genres of instrumental and orchestral music), in the 7th grade they study “Immersion in different layers of music” (church music, jazz, rock music, pop music), in the 8th grade they study “My music, yours, ours” (the generalization of the whole 8-year course).

Terms of the Research

Three academic years: 2016/17, 2017/18, 2018/19.

Scenario of Participation

Each schoolchild had the option to choose the following:
- An educational topic (one in each of the four school quarters - for 5–7 grades and each school half-year - for the eighth grades; for example, “Lullaby” / “Anthem” / “Romance” etc. in the 5th grade);
- One of the musical works capable of presenting the chosen theme (for example, “The Traditional Lullaby of Old-Timers of Siberia” / “Klara's Lullaby” from the opera “Porgy and Bess” by J. Gershwin and others for the topic “Lullaby”);
- A musical interpretation of the selected musical work (for example, the original performance from the opera/version performed by L. Armstrong and E. Fitzgerald et al./for the melody by J. Gershwin);
- Type of creativity for own development of the selected version (for example, sing solo/sing along with someone/perform movements to music/play independently/play along with any chosen musical instrument/create any illustration of music, theatrical scene, etc.);
- Presentation forms for own creativity - “live” performance, right during the lesson (which can be interpreted as the in-person presence of the public during the recording of one of the video duplicates) or a demonstration of the video, made earlier, outside the lesson;
- Participation forms for the presented creativity - individual performance or performance as part of any group (with someone from their own family/with friends/as a part of own choir, ensemble, orchestra).

Assessment Tools

The data collection instruments have been:
- Statistics on the connection of school children to participate in this educational project (the authors record in the protocol a number equal to the number of participants-performers in cases of project accomplishments as part of a group) in combination with a comparative analysis of

the quality of the performed work (analysis of real-time performances and audio-visual materials),

- Direct observation of the teacher during the lesson,
- Measurement of the level of educational and creative motivation, where: learning motivation - "Rating" methodology (students compile a list of school subjects, ranked by attractiveness and satisfaction in learning and creativity (Ali et al., 2018; Hamoud & Humadi, 2019); performed at the beginning and the end of the school year); creative motivation - an assessment of the positive dynamics for the productivity of educational projects (related to music) as an indirect reflection of positive motivation. Data collection tools are the following: analysis of performances in real-time, audio-visual materials, direct observation, etc.

The qualitative assessment ranks the measure of the adequacy of the student's creative work presented in comparison with the mastered artistic way. The ranking scale contains three possible assessments to eliminate the excessive factor of subjectivity in the evaluation: "not adequate" (0), "sufficiently adequate" (1), "a vivid manifestation of adequate development" (2). Let us note that such a simplification allows, to a certain extent, to avoid the difficulties that the teacher of music faces in the evaluation procedure – "music teaching was more like a tapestry that included nearly omnipresent threads of assessment and individualized instruction – threads that were often so interwoven as to be somewhat indistinguishable" (Salvador, 2019). It should be noted that we examine the concepts underlying terminology that has been used in inconsistent and contradictory ways (Halloran, 2015; Evans & Forney, 2010; Evans & Forney, 2010; Krause, 2015)

Formed the ability and willingness to apply rational methods of search, selection, systematization and use of information, to analyse various methodological systems and formulate their own principles and methods of training (Krause, 2015) and as well as the willingness to use modern methods and technologies, methods of diagnosing the achievements of students to ensure the quality of the educational process (Middleton, 2016).

Results and Discussion

Sociological Information about the Students

By the time the experiment began, 1,981 people were trained in the school where it was organised (1,019 girls, 962 children; 16 were handicapped children, 11 were children from families with many children, 271 from poor families, 317 from single-parent families - 280, having the citizenship of another state - 1, displaced children - 3, families with a high level of anxiety of relations between children and parents - 56), there are no nationalistic, extremist groups of minors. An analysis of out-of-school employment of children showed that 53.5% of

school children are engaged in institutions of additional education (sports, art, foreign languages, etc.).

On the one hand, as can be seen from sociological information, not all students of this school (including on the parallels where the experiment took place) because of the difficult economic situation of the family in which they are brought up, have the opportunity to use own personal computers (tablet, smartphone, etc.).

On the other hand, the authors see the reason why not all of the school children joined the project in the following:
- Not in the absence of a tool necessary for the task, because in such cases the teacher offers students options for combining with classmates, with friends, the help of the student's family,
- Not in the workload of children (teenagers) with other academic subjects,
- In the absence of interest and consistency of adults (parents, teachers, including - studying informatics)
- In such personal qualities that are not formed in a child (teenager), such as the creative initiative, self-reliance, feeling the right to make a mistake, etc.

Table 1: Number of completed projects

Classes	**2016/17 academic year**	**2017/18 academic year**	**2018/19 academic year**
5th	45+62+75+83/ of 157	83+133+96+116/ of 179	82+151+126+136/ of 177
6th	35+41+43+46/ of 160	49+53+65+67/ of 160	69+73+85+115/ of 182
7th	38+55+64+75/ of 151	63+83+105+112/ of 162	86+113+125+126/ of 160
8th*	144+148/ of 149	149+152/ of 153	155+157/ of 159

Source: Compiled by the authors

* 8th graders take part in the implementation of the class project due to the completion of the course. The final work of 6 students is missing for health reasons in 2017 and 2019, and of 5 students - in 2018.

Table 2: Percentage of students completing the project

Classes	**2016/17 academic year**	**2017/18 academic year**	**2018/19 academic year**
5th	29+40+47+53%	46+74+53+65%	46+85+71+77%
6th	22+26+27+29%	31+33+41+42%	38+40+47+63%
7th	25+36+42+50%	39+51+65+69%	54+70+78+79%

Source: Compiled by the authors

The dynamics of the number (on average per quarter) of school children who decided to carry out an educational project related to music:

- Among 5th grades - from 53.5% (2017), through 60% (2018) to 70% (2019);
- Among 6th grades - from 28% (2017), through 37% (2018) to 47% (2019);
- Among 7th grades - from 38% (2017), through 56% (2018) to 70% (2019);

The authors state the fact of increasing the percentage of students completing this class project from year to year for each parallel, as well as among the two parallels who participated in the experiment for all three academic years (starting in 5th/6th grades, having finished 7th/8th grades by now).

Among 6th graders, there is a drop in the number of people willing to participate in the implementation of the proposed project, which the authors explain as follows:

- Firstly, the more difficult annual study theme of the 6th grade (instrumental music) as compared to the theme of the 5th grade,

- Secondly, the psychological characteristics of this period of growing up (acquiring the skills of self-reflection, as a result, is more critical than before, the attitude towards oneself and others).

School Performance of Music-Related Educational Projects: Quality Analysis

The music teacher, class teachers, parents of school children - all those who got acquainted with the completed projects, assess the students' work experience on these projects as positive because the following is observed:

- The growth of quality in work - firstly, in the depth of comprehension of the artistic image (an adequacy measure in mastering a musical work in comparison with the original artistic image of this music), secondly, in expanding the genre-style repertoire chosen by school children.

Genre and style representation of works is distinguished by the following:

- The overwhelming number of works with samples of pop music (sounding from television screens, promoted through music chat rooms, video clips, through various channels of mass culture, on social networks, etc.),
- The tendency, though not significant, of expanding the number of examples from classical music and classical rock,

- Enormously (which worries) rare choice of folk music by school children.

In the first year of the experiment, 8th-graders (with the requirement of compulsory participation) had much work done with a formal attitude (for example, the presentation of a videotape where teenagers sing a children's song in a choir without their own distinct emotions).

In the 2nd, even more in the 3rd year, the number of high-quality works performed by school children increased, which happened thanks to:

- The systematic practice of tactful analysis (explanations, which are given to students),
- Demonstration of records with the most vivid educational projects,
- Permission to demonstrate their work not only on the big screen but also (in cases of shyness of the author/s) through the display of a laptop, tablet, and even a smartphone.

The Results of the Study of the Level of Educational and Creative Motivation

The increase in the level of academic motivation is recorded by the responses of students who are participating or have participated in the implementation of this class project:
- Directly: at the predominantly higher (by 2–4 points) position of the “Music” lesson in the ranking of school subjects (minus those cases when it was initially already on the top line);
- Indirectly: on the performance of school children.

Some decrease in the cumulative indicator of creative motivation (indirectly recorded) in 6th graders has already been analysed above when discussing statistical data on the number of completed works.

In the authors' opinion, it is correct to observe the dynamics of changes in the creative motivation of each student.

Conclusions

1. Analysis of the results obtained in the course of the experiment carried out by us on the implementation of school children’s project (directly or indirectly related to music created using ICT tools) confirms the main conclusion made earlier: the use of modern technical means has both positive and negative consequences.

1a) The authors see the following as positive consequences: expanding the practical experience of the student; obtaining skills in the use of ICT/MCT when performing operations on musical

material; the accumulation of a bank of educational work that performs the functions of reflection, didactics and broadcast.

1b) The authors see the following as negative consequences: appeal to musical examples presented in mass media and on the Internet as role models, but not of high artistic, ethical value; not being able to critically evaluate the merits of musical material, including its visual line, its poetic text without the help of an adult person; the lack of technical equipment among specific categories of school children; adherence to artistic, technological and other stereotypes; insufficient technological training, psychological problems of this age (lack of development of skills in reflection, possible manifestations of excessive self-criticism, poor teamwork skills, insufficient self-development, etc.).

2. Execution of a class project according to the scenario proposed by the authors (through creativity, directly or indirectly connected with music):
- Relevant for this age group (the transitional period from primary school age to teenage, to adolescence);
- Most often it is provided with high educational and creative motivation, including also because the schoolchild chooses the direction of own creative realisation;
- On the one hand, it represents an appeal to one of the most optimal forms for the implementation of general music education at the middle level in high school. On the other hand, it needs competent pedagogical support (teachers, parents);
- It contributes to the accumulation of real experience in the schoolchild, allowing for implementing own advantages and weaknesses, forming a taste under the condition of activation of critical thinking, to expand the musical (emotional, common cultural) outlook, etc.

3. The authors agree with Wan and Gregory (2018), highlighting five digital tools to promote motivational strategies in order to increase the involvement of school children and increase their motivation to practice music (categories of instruments: “practice logs, note feedback tools, portfolios, music stand software, and accompaniment tools” (Wan & Gregory, 2018) .

4. As well as Hallam et al. (2011), the authors consider it necessary to note that:
- “Barriers to further implementation relate to the perception by other school staff that the process is ‘chaotic' and can lead to a loss of control and subsequent poor behaviour, also that it does not apply to their subject” (Hallam et al., 2011);
- Teachers and parents need to recognize and implement “the need to develop instrumental skills earlier. This has implications for teaching in the primary school and the early years of secondary school” (Hallam et al., 2011).

5. The authors see prospects for teaching school children to music through the implementation of an educational project (related to music performed using ICT tools), on the one hand, in disseminating this experience in the practice of teachers and parents, on the other hand, in continuing research on this topic, allows to study the educational effect and in relation to children (teenagers) who are in other socio-economic, cultural and ethnic conditions.

REFERENCES

Adorno, Th. W. (2014). Selected works: sociology of music. Moscow: Centre for humanitarian initiatives: Universal book.

Ali, S. H., Alaa, K. H., & Wid, A. A. (2018). Analysing students' answers using association rule mining based on feature selection. Journal of Southwest Jiaotong University, 53(5). http://jsju.org/index.php/journal/article/view/236

Bates, V. C. (2018). Equity in Music Education: Back to Class: Music Education and Poverty. Music Educators Journal, 105 (2), 72–74. DOI: https://doi.org/10.1177/0027432118803046.

Benedict, C., Schmidt, P., Spruce, G., & Woodford P. (2015). The Oxford Handbook of Social Justice in Music Education. Oxford: Oxford University Press, 736 p.

Breeze, N. (2011). Music Education Research, 4(13), 389–405. Retrieved from: https://doi.org/10.1080/14613808.2011.632083.

Brown, A. R. (2015). Music Technology and Education: Amplifying Musicality. – Second edition. New York; London: Routledge, 264 p.

Budoiu, M. V. (2018). Technology versus Vocal Technique. Information and Communication Technologies in the Musical Field, 2(9), 47–56. Retrieved from: http://www.tic.edituramediamusica.ro/reviste/2018/2/ICTMF_ISSN_2067-9408_2018_vol_9_issue_2_pg_no_047-056.pdf.

Carrascosa Martínez, E. (2017). Technology for Learning and Creativity. Information and Communication Technologies in the Musical Field, 2 (8), 7–13. Retrieved from: http://www.tic.edituramediamusica.ro/reviste/2017/2/ICTMF_ISSN_2067-9408_2017_vol_8_issue_2_pg_no_07-13.pdf.

Chong, E. K. M. (2012). Information and Communication Technologies in the Musical Field, 3, 7–13. Retrieved from: http://www.tic.edituramediamusica.ro/reviste/2012/017-023.pdf.

Coutinho, E., & Scherer, Kl. R. (2016). The effect of context and audio-visual modality on emotions elicited by a musical performance. Psychology of Music, 4(45), 550–569. DOI: https://doi.org/10.1177/0305735616670496.

Evans, N. J., & Forney, D. S. (2010) Guido, F. M. Patton, L. D. and Renn K. A. Student Development in College. San Francisco, CA: John Wiley and Sons.

Finney, J., and Burnard P. (2007). Music Education with Digital Technology. A&C Black, 240 p.

Gorbunova, I. B., & Hiner, H. (2019). Music Computer Technologies and Interactive Systems of Education in Digital Age School. Series: Advances in Social Science, Education, and Humanities Research. Proceedings of the International Conference Communicative Strategies of Information Society (CSIS 2018). February 2019. DOI: https://doi.org/10.2991/csis-18.2019.25

Gorbunova, I. B., & Zalivadny, M. S. (2018). The Integrative Model for the Semantic Space of Music: Perspectives of Unifying Musicology and Musical Education. Music Scholarship. 2018. 4, 55–64. DOI: http://dx.doi.org/10.17674/1997-0854.2018.4.055-064

Gorbunova, I. B., & Goncharova, M. S. (2016). Tablet (mobile) technology for professional music education. Media music, 6. Retrieved from: http://mediamusic-journal.com/Issues/6_3.html

Gorbunova, I. B., & Plotnikov, K. Yu. (2018). "The Position of Music Computer Technologies in Informatics Course for Secondary School," International Conference on Multidisciplinary Research & Practice (ICMRP). Oxford, UK. Proceedings of the ICMRP International Conference, Sept., 1- 4.

Gorbunova, I. B., Davletova, C. B., & Tovpich, I. O. (2018). Electronic Musical Instruments in the General Music Education System. In Prof. Dr. B. Topcuoglu, Prof. Dr. M. Plaisent, Dr. Thaweesak Yingthawornsuk (Ed), 15th Int'l Conference on Education, Economics, Humanities, and Interdisciplinary Studies. Paris, France. EEHIS-18 International Conference Proceedings, pp. 139–143, June 2018, DOI: https://doi.org/10.17758/URUAE2.AE06184023

Guillén-Gámez, Fr. D., Álvarez-García, Fr. J., & Rodríguez I. M. (2018). Digital tablets in the music classroom: A study about the academic performance of students in the BYOD context. Journal of Music, Technology & Education, 2(11), 171–182. DOI: https://doi.org/10.1386/jmte.11.2.171_1.

Hallam, S., Creech, A., & McQueen, H. (2011). Musical Futures: A Case Study Investigation. Publ.: Institute of Education at the University of London. London, 181 p.

Halloran, W. F. (2015). The William Sharp "Fiona Macleod" Archive. London: School of Advanced Study, University of London.

Hamoud, A. K., & Humadi, A. M. (2019). Student's Success Prediction Model Based on Artificial Neural Networks (ANN) and A Combination of Feature Selection Methods. Journal of Southwest Jiaotong University, 54(3). http://jsju.org/index.php/journal/article/view/305

Hargreaves, D. J. MacDonald, R., & Miell, D. (2005). "How do people communicate using music," in Musical Communication, eds D. Miell, R. MacDonald, and D. J. Hargreaves (Oxford, UK: Oxford University Press), 1–26.

Hess, J. (2019). Singing our own song: Navigating identity politics through activism in music. Research Studies in Music Education, 41(1), 61–80. https://doi.org/10.1177/1321103X18773094.

Krause, A. E., North, A. C., & Hewitt L. Y. (2015). Music-listening in Everyday Life: Devices and Choice, Psychology of Music, 43(2), 155–170.

Krause, A. E., North, A. C., & Hewitt, L. Y. (2015). Psychology of Music, 2(43), 155–170 Retrieved from: https://www.academia.edu/28417661/Krause_A._E._and_North_A._C._2017_._Pleasure_arousal_dominance_and_judgments_about_music_in_everyday_life.

Middleton, A. (2016). Reconsidering the Role of Recorded Audio as a Rich, Flexible and Engaging Learning Space. Research in Learning Technology, 24, DOI: 10.3402/rlt.v24.28035

Muntean, L. (2017). Information and Communication Technologies in the Musical Field, 2 (8), 21–27. Retrieved from: http://www.tic.edituramediamusica.ro/reviste/2017/2/ICTMF_ISSN_2067-9408_2017_vol_8_issue_2_pg_no_21-27.pdf.

O'Neill, S. A. (2014). Music and Media Infused Lives: Music Education in a Digital Age, 6. Publ.: Canadian Music Educators' Association, 371 p.

Overland C. T. Music Education. (2017). Music Educators Journal, 104 (1), 55–61 DOI: https://doi.org/10.1177/0027432117719462.

Pinch, T. J., & Bijsterveld, K. (2003). Technology and Culture, 3 (44), 536–559. DOI:10.1353/tech.2003.0126.

Pop-Sârb, D. E. (2016). Instruments in Musical Education - Between Tradition and New Technologies. Information and Communication Technologies in the Musical Field, 2 (7), 23–32 Retrieved from: http://www.tic.edituramediamusica.ro/reviste/2016/2/ICTMF_ISSN_2067-9408_2015_vol_7_issue_2_pg_no_23-32.pdf.

Radhy, Z. H. (2019). Application of Multiply Regression Linear Model and New Technology Method in Estimating Learning and Education of Students. International Electronic Journal of Mathematics Education, 14(1), 87-90. https://doi.org/10.12973/iejme/3978

Rowe, V., Triantafyllaki, A., & Pachet Fr., (2017). Children's Creative Music-Making with Reflexive Interactive Technology. New York: Routledge, 256 p.

Salvador, K. (2019). Assessment and individualized instruction in elementary general music: A case study. Research Studies in Music Education, 41(1), 18–42. DOI:https://doi.org/10.1177/1321103X18773092.

Wan, L. A., & Gregory, S. (2018). Digital tools to support motivation of music students for instrumental practice. Journal of Music, Technology & Education, 1(11), 37–64. DOI: https://doi.org/10.1386/jmte.11.1.37_1.

Weinberg, M. K., & Joseph, D. (2017). If you're happy and you know it: Music engagement and subjective wellbeing. Psychology of Music, 2(45), 257–267 DOI: https://doi.org/10.1177/0305735616659552