Thematic Article

Digital Tools of Universal Music Education

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Abstract

The purpose of this article is to present various solutions concerning music education aided by computer technologies. The article applies public music education. The author attempts to provide an answer to questions concerning the role of music teachers working with new media , which requires them to constantly improve and expand their skills. How are they able to utilise new technological achievements while at the same time blending them with well-proven, traditional methods of music teaching/learning, without falling prey to the dangers of modern media ? Any attempts at using innovative solutions are bound to cause numerous challenges for students, teachers, and the entire education system. However, the effects of such actions could contribute to the improvement of the quality of music education in society, which justifies the efforts. The intention of the author is attempt to look into the future on the basis of the existing data sources, analyses and global pedagogical trends and to search for theoretical and practical solutions, which may influence the formulation of the paradigms in modern music teaching.

*Keywords***:** music education, digital tools, music teacher, Information and Communication Technologies (ICT), Multimedia in music education

Introduction

Music education aided by computer technology undergoes constant changes.

Music teachers equipped with digital tools have much greater capabilities in terms of planning their classes than teachers working according to traditional methods. Multimedia competences and the skill to use of music software give them the opportunity to enrich and make the process of teaching and learning music more attractive.

The authoress asks a series of questions aiming at identifying educational solutions taking into account the use of modern ICT technologies in the process of aesthetic education of the young generation, who find it rather difficult to distinguish between valuable music and the waste of the digital civilisation. The author emphasises a significant role of a teacher, who within a paradigm of the modern digital education becomes a consultant and advisor in place of an omniscient master than teachers working according to traditional methods. Which computer programs are used by today's music teachers in their work? What is the level and scope of usage of modern technologies in music education? What qualifications should the music teachers have and which forms of improvement should they use to avoid risks associated with the digital era? In which direction should public music education supported by the digital technology go, to achieve the desired effects and prepare the young generation to correctly use the resources of national and global music culture?

An attempt to resolve these problems on the basis of theoretical analysis and diagnostic research aims to find solutions which may influence both the form and direction of future music education.

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Educational opportunities of digital tools

In today's music education, we often use digital tools which allow the students to decide the direction of actions and affect the style of presentation or search for data. The combination of multiple media, graphical and audio components, acoustic effects, narration, dialogue, film sequences and animation makes the process of teaching and learning far from monotonous. Interaction between students and computers influences various forms of activity (sensory, emotional, intellectual, verbal and motor), at the same time developing creativity in addition to cognitive disposition (Parkita 2005, p. 40, Milner, Mann, Bawa 1998, p. 181).

The benefits of multimedia are widely appreciated by the publishers of music textbooks, who provide multibooks, or electronic versions with multimedia materials, to complement their printed textbooks. Intuitive interfaces, accessibility of music files with notation, examples to listen to and analyse, presentation of voices, choirs, instruments and orchestras, utilities for composing melodies and rhythms, teaching boards, musical presentations connected to the subjects from the textbooks, accompaniment to songs and instrumental pieces, interactive games and exercises for the students to consolidate the knowledge and skills gained in class make such textbooks more friendly and familiar to "digital natives" of the modern age (Kołodziejczyk, Polak 2011, pp. 39-40; Parkita 2020, p. 214). The pace of teaching can be adjusted to the individual predispositions of the learners according to their capabilities. One of the tools most commonly used at school is an interactive display that can replace many different devices used in classrooms, such as a computer, a board, or a projector. Interactive displays must meet such challenges as continuous operation for several hours or their simultaneous use by many people. The screen can be connected to a mobile device (regardless of its operating system) using WiFi, from a level at which the displayed contents can be managed. The displays are also compatible with all other external devices. Using modern software, teachers can create particularly useful teaching aids, e.g. lesson scenarios, multimedia presentations with the use of animations, films, audio files and interactive exercises. Although they require the teacher to invest time and effort, these teaching aids provide invaluable help in unravelling the design and sound of musical instruments, the characteristic sounds of a particular era or a puzzling musical phenomenon (Parkita 2014, p. 61).

Information technology allows one to effectively stimulate the creativity of students and develop their musical knowledge (Kołodziejski 2012, p.100-103; Mellor 2008, pp. 451-472; Pearson, Somekh 2006, pp. 519-539).

Music teachers, during the process of preparing classes, tasks for the students, and tests to check their knowledge, aside from multimedia and professional music software designed for saving, creating, processing, cataloguing, playback, transfer of audio files such as: Finale, Cubase, Sibelius, Capella (commercial software that is unlikely to be used in the classroom), and may also use free music software. The most noteworthy programs are:

MuseScore — notation editor with easy input via mouse, keyboard or MIDI system. Up to 4 voices can be placed on a single stave. It includes an integrated sequencer and software synthesizer called FluidSynth and can import and export MusicXML files, and standard MIDI files (SMF). It can be used in public school education to create monophonic and polyphonic songs, play sheet music as well as print saved songs. Very useful for older students (grades 5-8) is the function of adding text to the score - song words, performance markings or author's suggestion. The pieces written by students can be transposed to different keys.

Studio One Free — transforms your computer into a record studio. Its functionality is complemented by sets of samples used for composing music.

Audacity — audio file editor supporting the following formats: WAV, AIFF, AU, MIDI, MP3, OGG. Its functions include recording, playback, import and export of files. The recorded audio tracks can be edited, cut, copied, pasted and mixed. While editing, the user can use such effects as echo, noise filter and fade. The program can be used by students of senior years of the public primary or secondary schools. Students enjoy experimenting with sound and its possibilities.

The program supports VST and LADSP plug-ins, which extend its core functionality. Apart from recording, the application is capable of conversion from analogue to digital (Parkita 2014, p. 63).

Among the available free software, you can find applications used to teach singing and the basics of playing various instruments (piano, keyboard, accordion, guitar etc.).

Aside from those listed above, there is a wide selection of computer software which can be used in music education for reading notes, ear training and composing simple instrumental pieces. This group of programs gives us the opportunity to familiarise the students with notation and the principles of music, at the same time developing their aural skills. After about a dozen tasks involving the identification of a sound appearing on the

stave, the program summarises the student's responses and displays the number of errors. Such software also allows us to practice interval recognition (melodically or harmonically). Thanks to such programs, even younger pupils of grades 1-3 can learn musical notation or recognition of musical intervals. Creating and writing down simple melodies done by a student can bring him a lot of satisfaction. The range of material can be adjusted to the student's skill level. With the harmonic module, they can learn to recognise chord modes. With a microphone plugged in, such programs can also be used for singing intervals and solfege exercises, which are controlled by the computer. The rhythm module trains the sense of rhythm among the students. The discussed group of programs also includes **Ear Master Pro**, which is designed for ear training from beginner to advanced levels. In public music education, we can use the basic module. Students can familiarize themselves with the intervals, scales, and rhythm groups discussed in the lessons.

It provides a number of training modules such as: recognition, comparison, singing intervals, recognizing chords and their inversions, scales, reading and repeating rhythm, rhythmic and melodic dictation. We can choose the level of each exercise, adjusting it to every student. The application provides two types of exercises: standard exercises, based on classic harmony, and jazz exercises, based on jazz harmony. All exercises are randomly generated by the program. The application includes a test module, which allows the teacher to conduct a music exam for several students at the same time in an appropriately equipped classroom. The results of the test(s) are displayed on the screen (Parkita 2014, p. 64).

Another example of free note reading software is **Jalmus**, which consists of three modules. In the first module, the user is asked to indicate the location of a specific sound on the virtual keyboard, with the notes displayed on the stave. Notes can be read in treble clef or bass clef or both at the same time. The second module is for learning to read rhythmic values. The third module (which combines the features of the first two) requires a keyboard, which is used to play the melody displayed by the program. Jalmus is easy to use and supports many language versions (including Polish), which makes it useful even for primary school students who want to learn reading notes. The program contains both lessons and exercises. Notes are input with the mouse or a MIDI keyboard.

Another program recommended for Polish schools for ear training and learning music theory is a free application called Dysonans. After signing up, users receive a login and a password which allow them to save the program on portable media and use it on any computer with Internet access (Parkita 2014, p.64). The program is recommended both for students starting their adventure with music and for students of higher grades elementary public school.

While searching for music software, music teachers are free to use the openly-available educational resources under the *Creative Commons* (CC) licence.

The Role of The Teacher in Digital Music Education

In the world determined by modern technologies, the role of the teacher also changes, as they enter a new area of work and requirements, differing significantly from the one they experienced during their education (Russell G., Finger G., Russel N. 2000, pp. 149-165). A music teacher equipped with the information and communication technology expands their possibilities for planning lessons. Having medial competences and skills to use music computer programs at their disposal, they can create very interesting scenarios for music lessons, which will definitely encourage children and youth to experience this area of arts. Amongst a range of very important issues with which students of music courses (future teachers) should be acquainted, the following should be mentioned here:

- operation of computer applications, such as: Sibelius, Finale, Forte, Note Worthy Composer, Capella, SongWriter, Smart Music, which can be used to edit musical notations, as well as enter them using a keyboard of a MIDI instrument or a mouse to write them on a stave; some of them also transform music files into musical notations;
- knowledge of applications saved in the MIDI format; learning options for recording, playing, copying, and edition of multi-track music files;
- knowledge of operation of real and virtual electronic instruments, sequencers, effect processors, and mixers;
- creation of music works using sounds of individual instruments and entire libraries of sounds;
- arranging of music instruments, creating accompaniment for songs using possibilities offered by electronic instruments;
- collecting and storing of teaching materials in a digital form;

- ability to exchange teaching experiences with other music teachers from different parts of Poland and the world via the Internet;
- presentation of professional literature concerning the use of multimedia programs and music IT solutions in education (Parkita 2012, pp. 42-43).

The above-mentioned skills should also include the knowledge of methods used in digital education, such as, for example, gamification, flipped classroom, or blended learning .. every teacher can support development of their methodological tools using templates of good practices applied by a society of Super Teachers (Parkita 2018, pp. 112-113).

Studies conducted among music teachers show that everyone declares that computer skills are vital in music teacher`s work. However, there are barriers which do not allow for using information technology in instructing the subject. Teachers themselves notice that age and lack of time are the main reasons for a bad situation, though schools are equipped with computer labs where classes could be conducted. Some teachers, usually those with long teaching experience, evade using new technologies, simply because they do not know them (Parkita & Trzos 2016, pp. 57-58).

It turns out that there are teachers who understand the need to use computer technologies in music education and use it successfully. Out of 20 teachers, only 20% claims to use music notation software. Audio editors, which are relatively simple and widely available applications capable of such operations as: cutting, copying, tempo or key change, are used often by 30%, and rarely by 40% of the respondents. Other teachers do not use such programs in their work (Parkita & Trzos 2016, p.58).

In recent years, the popularity of DAW (Digital Audio Workstation) software for processing and composing music has increased among teachers (Rosiński 2013, p. 125). Programs of this type combine the worlds of Audio and MIDI, which brings unlimited capabilities for recording their own compositions or creating arrangements of famous works at home, without access to a recording studio. For teachers, the ability to use such software can make work much easier (Jennings 2005, pp. 225-238; Newton L., Newton D. 2010, pp. 111-124). Six people (30%) said that they often use those programs, while other respondents do it rarely or not at all. The surveyed teachers (75%) do not use software for ear training and learning music theory. MIDI playback or karaoke software are used for entertainment purposes, such as school and extracurricular events (Parkita & Trzos 2016, p.58).

Less than half of the respondents (40%) know how to upload background music using an electronic keyboard with automatic accompaniment in .wav or .mp3 format. The other 60% do not have this skill. The same number of teachers have difficulties with editing audio or MIDI files from the Internet and describing the utility programs used for this purpose. As for the source of arrangements, it turns out that four people (20%) create their own arrangements, seven (35%) buy ready-made products, while the other nine (45%) look for openly available materials (Parkita & Trzos 2016, p. 58).

In educating future music teachers, one should consider combining information technology with the issues of arrangement, composing, harmony, ear training and music teaching methodology. This is necessary to enable them to take advantage of the benefits of digital technology.

New challenges for the modern school

One of the prominent trends in today's education is to prepare the students as conscious participants in the educational process. They should be active attendants and co-creators, not just passive recipients. This is made possible by the **Web 2.0** technologies used in education (including music education), such as:

- **Wiki** — it is a kind of website where the content can be created and changed easily using a web browser. It enables collaboration between many users involved in the creation of web content. The ease simplicity, and the ability to create links to external and internal resources give each participant of the teaching process the opportunity to write any entry they need or include new content in an existing one. It may also serve as a source of knowledge for the students or an environment for its formation, and may be helpful in the project method. Wikis are useful for creating media repositories, an example of which is Wikimedia Commons, where you may find audio files, acoustic effects, notation, photographs, films, and animations; Wikisource, which contains a repository source texts; Wikiquote, which contains a repository of important quotes of famous people such as composers and music critics; and Wikispaces, which contains catalogues of various music genres. It is important to remember that Wikipedia may not be used as the main source of knowledge.
- **Blogs and Microblogs** — they are a popular way of using the Internet and one of the key pillars of Web 2.0. They can have the form of specialised journals, thematic portals, or marketing tools for social

activities. A typical blog consists of: entries of the blogger with the readers' comments, links to other blogs, and tags (Czekaj, Skierska, 2011). Blogs are mostly textual, but they may also consist of film clips, photos, or a combination of text and other means of communication. Blogs may serve as a source of knowledge, inspiration, problem-solving ideas, encouragement for various forms of musical activity, or an alternative space for meeting with students where you can dedicate more time and attention to discussing specific details. Blogs kept by music teachers can contribute to the development of music interests in students and expand the class material. Posting interesting materials, photos, music files, films, links to music websites, or solving specific music problems can help establish a deeper cooperation with the students (in checking or broadening their knowledge) or other teachers. As part of homework, music teachers can give their students the task of starting a thematic blog where other students can comment on the entries of the author. This can lead to interesting music projects, for example in relation to visiting an opera house, an orchestra hall or a concert of their favourite band. Students publish films, photographs, posters, parts of interviews, musical recordings and their own narrations on their blogs. Using websites such as GoAnimate.com, ToonDoo.com, they can also create their own animated films with the use of music, which has been pre-recorded or composed with specific software. **Microblogs** are a specific subtype, focused on posting the author's updates on an on-going basis. They may include additional audio material, photographs, films or animations.

- **Social bookmarking** — it is a place where we can collect and store recommendations for links to web pages and messages which are of interest to us. Such collections are generally open to the public as private collections or serve groups of people with particular interests. The idea behind this form of educational support is to facilitate discovery of Internet resources dedicated to specific music themes. Creating collections of external resources may broaden the knowledge gained in class and during extracurricular activities. Keeping such collections by students is an indication of their artistic interests and may be intriguing material for analysis.
- **File sharing and exchange services** — they are used for publication, search, and presentation of electronic files. For example, YouTube is one of the most popular portals, hosting a multitude of educational films of all kinds. When appropriate instructions are provided by the teacher, they may be useful for the purposes of music education.
- **Social networking sites and virtual worlds** — they create perfect environments to meet people with similar interests, passions, motivations, and co-create artistic projects with them in the virtual world. For the youngest group, the Internet is mostly a source of information about culture and entertainment, new technologies and daily events. It should be noted that both primary school and middle school students use the Internet to look up study information they find interesting, since it ranks in the top ten of the most important topics for children. An example of a virtual world which reflects reality (in an improved way) is Second Life. People participating in this world act through avatars. Second Life can be used in e-learning, where the avatars of the participants may meet and gain knowledge in a virtual school (Czekaj, Skierska, 2011, p. 37).

Distance education over computer networks and the Internet has gradually become more popular in recent years (Sysło 2009). This creates an alternative to the existing school classes. The capabilities of electronic platforms greatly accelerate the exchange of materials and communication, and enrich the process of gaining knowledge and interaction. Distance education means a way of teaching in which there is no unity of time and space in terms of the learners, the teachers, and the course of classwork. Distance education with the use of technology has the following characteristics (which in a sense compensate for the lower degree of personal contact between teachers and students):

- asynchronous communication between the teacher and the learners, and between the learners themselves;
- wider spectrum of educational materials in electronic format communicated by the teacher and the learners;
- greater organisational rigour of the educational process to ensure completion of educational objectives within the assumed curriculum with participation of learners (Sysło 2009).

Another type of distance education called blended learning combines face to face and distance learning, where the latter is supplemented by traditional teaching methods. Online education uses a remote teaching environment called Moodle (Modular Object-Oriented Dynamic Learning Environment). Moodle enables the user to create and manage online courses. Information is divided according to subjects and posted on the platform by the teacher and the students. Several modules are used to improve the effectiveness of teaching, such as: lesson, chat, forum, assignment, quiz etc. This platform gives the teacher the ability to post materials with links to Internet resources, animations or e-books. After signing in, the students can contact one another

via the forum, which is moderated by the teacher. Automatically generated e-mails are also used for information purposes.

Educational impact is also related to the issue of electronically monitoring students' progress. Youth who feel the focused attention of their parents, teachers and educators are more motivated to do more work. This kind of monitoring is attainable in today's digitized economy (Jennings 2005, pp. 225-238; Al-Zaidiyeen, Mei, Fook 2010, pp. 211-218; Hennessy, London 2013, pp. 15-24).

Conclusions

The use of computer technology to aid public music education and the improvement of media competences of music teachers can bring tangible benefits in the nearest future by increasing the level of musical culture in society. Modern reality should not be a barrier for learners, it should be a source of inspiration and ideas in the shaping of the future of music education. If school offered equivalents in the form of perfect equipment, modern facilities, well-qualified staff and the latest teaching methods, the expectations of pupils could be met and top-quality art could be included in the general process of forming their sensibility.

References

Al-Zaidiyeen, N. J., Mei, L. L. & Fook, F. (2010). Teacher`s Attitudes and Lewels of Technology Use in Classroom: The Case of Jordan Schools. *International Education Studies, 3*(2), 211-218.

Czekaj, K. & Skierska-Pięta, K. (2011). *Innowacje i technologie informacyjne przyszłością nowoczesnej edukacji (Innovations and Computer Technologies – The Future of Modern Education).* Łódź: Oficyna Wydawnicza "Humanitas".

Hennessy, S., London, L. (2013). *Learning from international experiences with interactive whiteboard: the role of professional development in integrating the technology.* [OECD Education Working Papers, nr 89]. Doi: 10.1787/5k49chbsnmls-en.

Jennings, K. (2005). A Case Study in Computer Mediated Music Composition. *Education and Information technologies, 10*(3), 225-238.

Kołodziejczyk, W. & Polak M. (2011). *Jak będzie zmieniać się edukacja? Wyzwania dla polskiej szkoły i ucznia*. Warszawa: IBE.

Kołodziejski, M. (2012a). *Muzyka i wielostronna edukacja dziecka*. Częstochowa: Wyższa Szkoła Lingwistyczna.

Mellor, L. (2008), Creativity, originality, identity: investigating computer – based composition in the secondary school. *Music Education Research, 10*(4), 451-472.

Milner, A., Mann, T. & Bawa, J. (1998). *Multimedia. The complete Guide.* London: Dorling Kindersley.

Newton L. & Newton, D. (2010). Creative thinking and teaching for Creativity in Elementary School Science. *Gifted and Talented International, 25*(2),111-124.

Parkita, E. (2020). Music Teacher in Cyberspace – Native, Immigrant or Digital Wise Man. In E. Parkita, A. Parkita, J. Sztejnbis–Zdyb (Eds.), *Contexts in Culture and Music Education.* Kielce: UJK.

Parkita, E., Łyjak, W., Jabłońska, A. & Parkita, A. (2018). *Cyfrowa przestrzeń kultury i edukacji muzycznej.* Kielce: UJK.

Parkita, E., Trzos, P. (2016). Enhancing the Development of Audiation in Early Music Education Using Multimedia (a Polish example). *Formazione&Insegnamento, XIV*(3), 39-49.

Parkita, E. & Trzos, P. (2016). Digital Environment in Music School Education. *International Journal of Music&Performing Arts, 4*(2), 50-61.

Parkita, E. (2014). Educational computer programs within the practice of music education, In M. Kołodziejski (Ed.), Creativity in music education. Płock: Akademia Humanistyczna im. A. Gieysztora.

Parkita, E. (2012a). Media Competence of Music Teachers and Modern Requirements. *Pedagogical Studies – Social, Educational and Artistic Issues, 21*, 37-38.

Parkita, E. (2012b). Computer Aids in Public Music Education in Poland. Threats and Opportunities), In A. Michalski (Eds.), *Identity of Music Pedagogy. Volume I Pedagogy of Music. Characteristics. Axiology. Systematics.* Gdańsk: Athenae Gedanenses.

Parkita, E. (2005). *Reception of Artistic Music by Children of Senior Years of the Primary School.* Kielce:AŚ.

Pearson, M. & B. Somekh (2006). "Learning Transformation with Technology: A Question of Sociocultural Contexts?". *International Journal of Qualitative Studies in Education, 19*(5), 519-539.

Rosiński, A. (2013). *Wykorzystanie komputera w realizacji nagrań muzycznych.* Bydgoszcz: UKW.

Russel, G., Finger, G. & Russel N. (2000). Information technology skills of Australian teachers: Implication for teacher education. *Journal of Information Technology for Teacher Education, 9*(2), 149-165.

Sysło, M. M. (2009). E-Learning in School. *E-mentor, 1*(28). Retrieved from: http://www.e-mentor.edu.pl/artykul/index/numer/28/id/611