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Voices across the border





Enhancing the Development of Audiation in Early Music Education Using Multimedia (a Polish Example)

Migliorare lo sviluppo dell'ascolto nell'educazione scolastica della scuola preparatoria attraverso l'uso di supporti multimediali (un esempio polacco)

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ABSTRACT

This article refers to the use of multimedia on early stages of music education in the context of the category of audiation. Theory of universal music learning, according to Gordon, is mostly directed at teachers. The text presents the possibility of implementing E. E. Gordon's theory into professional training of early music education teachers at Kazimierz Wielki University in Bydgoszcz in Poland. The author recognises the importance of shaping research competences of future teachers as they help students use not only practical (pedagogical), but empirical work of E. E. Gordon's theory. The text presents also the reports from research on the application of E. E. Gordon's Theory of Music Learning, carried out by students of early school and music education at Kazimierz Wielki University in Bydgoszcz in Poland. Such expectations are taken into consideration in the Music Fairytale "e-Audiation Songbook" project, described in this text, which from the beginning has been the field of practical and empirical application of the elements of E.E. Gordon's theory by the staff and student team cooperating in the Faculty of Music Education of the Kazimierz Wielki University in Bydgoszcz.

Questo articolo riguarda l'uso della multimedialità nelle prime fasi di educazione musicale nel contesto della categoria di ascolto. La teoria dell'apprendimento musicale universale, secondo Gordon, è per lo più rivolta ai docenti. Il testo presenta la possibilità di implementare la teoria di E. E. Gordon all'interno della formazione professionale degli insegnanti di musica antica presso la Kazimierz Wielki University di Bydgoszcz in Polonia. L'autore riconosce l'importanza della formazione alle competenze di ricerca dei futuri insegnanti, in quanto essi aiutano gli studenti utilizzando non solo un lavoro pratico (pedagogico), ma traducendo in lavoro empirico la teoria di E. E. Gordon. Il testo presenta anche delle relazioni di ricerca sull'applicazione della teoria di E. E. Gordon sull'apprendimento musicale, realizzate da studenti della scuola preparatoria e di educazione musicale presso la Kazimierz Wielki University di Bydgoszcz in Polonia. Tali prospettive sono prese in considerazione nel progetto Musica Fairytale "e-Audiation Songbook", descritto in questo testo, che sin dall'inizio è stato il campo di applicazione pratica ed empirica degli elementi della teoria di E. E. Gordon da parte del team di personale e studenti collaboratori presso la Facoltà di Educazione musicale Kazimierz Wielki University di Bydgoszcz.

KEYWORDS

Audiation, Music Education, Multimedia, Teaching, Innovation.

Ascolto, Educazione musicale, Multimedialità, Insegnamento, Innovazione.

Introduction

Dynamic development of the information and communication technologies is affecting numerous aspects of a human life, posing high expectations also on the education system. Therefore teachers are required to perform in-depth and extensive research on the use of modern technologies in upbringing and education.

Multimedia, as the name suggest, make it possible to combine various means of communication: visual (photos, graphs, pictures) and aural (recorded music, acoustic effects, lectures, dialogues), as well as movies (film sequences, cartoons). This combination opens enormous possibilities of applying computers also in music education. The most characteristic advantage of this technology is the assumption that the user is not a passive receiver of the presented content, but adjusts the way of viewing and searching data, and chooses the direction of activities. Education via multimedia means that the learners gain knowledge and skills in the audio-visual and symbolic language (Strykowski, 1997, pp. 5-6). This collaboration and dialogue with the computer influences different types of activity in children (sensory, intellectual, verbal, motoric, emotional), enriching their cognitive skills, as well as the ability of targeted, creative thinking and acting.

1. Technologies in music education

Supporting early music education with computer technology has huge possibilities and promises to develop performing, creative, and perceptive skills in children. Another important advantage of a computer is the possibility to store and process vast music resources in different file types: audio (music pieces in best interpretations), video, animation, musical films, images, photographs, and software, which can be used at any time during music classes. Internet connection is an indispensable feature, broadening the range of possibilities. Well-designed music education software is of great didactic value when introducing learners to the world of musical terminology, notation (associating sound with a particular position on the five-line staff, name, pitch and duration), music history, ear training and aural skills, sense of rhythm, music-related memory, singing (learning correct sound production and breath control by listening to the reference version and child's own performance), and playing musical instruments. Music software can also be applied in creative development of children, allowing them to compose their own motives, melodies, and full pieces, as well as to add accompaniment to a song, modify scores registered by notation editor software, and play the resulting music. Such software may have a beneficial influence, enhancing the development of learners' imagination and interest in music. The following features can be of use:

- Designing teachers' working environment (information materials, score files, recordings of a selection of pieces and their accompaniment, multimedia presentations, designing action plans).
- Active search and storage of data (selection, archiving), use during school activities (use of multimedia charts, interactive blackboards, Internet resources, including hypertext techniques and multibooks).
- Use of electronic techniques and diagnostic tools to evaluate musical development of learners.
- Promoting mini-innovations in education.
- Supporting e-learning solutions (platforms and databases of developed didactic and diagnostic solutions).

Didactic materials carefully designed by the teacher can also stimulate the learners, directly or indirectly, to take on creative activities. This can be achieved by the use of sound samples, such as different acoustic tones and effects, melodies or harmonic background, which learners can use to create interesting forms. Stimulating musical creativity in learners is a very difficult task. Information technologies can be helpful, but they have to be used appropriately. Creativity of the music teacher is also of great importance (Newton L., Newton D., 2010, pp. 111-124; Russell G., Finger, Russell N., 2000, pp. 149-165; Wojtas, 2005, pp. 99-102; Parkita, 2013, pp. 44-46; Pearson, Somekh, 2006, pp. 519-539).

Moreover, on early stages of education, learning through play is crucial. Also in this respect, good practices have been established of using multimedia in educational games for music learning. The designed software combines elements of education, aesthetics, and entertainment that stimulate the development of social skills (Mann, 1995, p. 5). These solutions correspond to the respective requirements, which include the following:

- The interface needs to be simple, natural and friendly for the child;
- Reactions to any user activity should be understandable and immediate;
- The software should be operated by pointing and selecting options with the mouse rather than entering text using the keyboard;
- Valuable didactic material should be combined with good entertainment;
- Logical and creative thinking should be taught;
- Sense of aesthetics should be developed;
- Gradation of task difficulty should correspond to the observable progress of the learner;
- Rewarding the child for correct problem solving with a short melody or interesting sound effect;
- Introducing diversity of activities to avoid boredom and discouragement for further work;
- Possibility to stop and complete the work in any place (Juszczak, 2002, p. 344).

Numerous musical games and multimedia software for music education are commercially available (Parkita, 1998, pp. 212-221; 2004, pp. 196-199; 2005, pp. 137-142; 2013, pp. 46-47; 2014, pp. 60-62; Milner, Mann, Bawa, et al., 1998, p. 181, Mellor, 2008, pp. 451-472; Kołodziejski, 2012a, pp. 100-103).

2. Technology for audiation development

When analysing the advantages of digital support for early music education, it is usually assumed that the technology should not only facilitate achieving knowledge about music, but also developing selected, actual musical skills, believed to be significant. The aim is targeted and intense stimulation of the main cognitive processes in music (such as memory, attention, perception, focus, good reflexes, and visual-motor integration). One of the key areas of cognitive development in a child is developing rational (i.e. objective) musical thinking skills, which is thinking in the language of music (and its attributes). Developing musical language based on the correct, i.e. rational motivation, is definitely one of the most important and greatest challenges of the modern music education. Results of the Polish research show that success depends on the significant development of musical thinking, understood as audiation, as defined by Edwin Gordon (Zwolińska, 2013, pp. 143-155; Bonna, 2013, pp. 66-86, Kołodziejski, 2013, pp. 410-429). Content of the curricula, which are dedicated to audiation and make use of computer technology, make it possible to introduce new elements that corre-

spond to the current level of musical development in the learner. Attractive form of communication is also a significant factor that shapes the appropriate interaction between the learners' musical development (learning potential) and their attitude towards music.

Introducing learners to the world of attributes of music and shaping their ability to assess music consciously is challenging but feasible on early stages of music education. Such activity must not be treated lightly or belittled as a pleasant form of general contact with music. Providing teachers and learners with diversified and appropriately designed experience in the practical music learning is crucial. Such activity, which emphasises delivering appropriate sequence of musical stimuli throughout education, is the domain of research carried out by Edwin E. Gordon.

3. Model of education designed in Bydgoszcz as a laboratory of audiation development

Academic model based on the assumptions of the music learning theory of E.E. Gordon is an innovative model in Poland. It includes the specific role of talent in music learning as a multidimensional construct. In such adaptation of Gordon's concept of giftedness, implications of other known psychological and educational concepts are of high importance. These include: J. Renzulli's model, F. Mönks's model, The Munich Model of Giftedness by K. Heller et al., and model of giftedness by R. Milgram (Renzulli, 1986, pp. 51-92; Heller, Perleth, 2008, pp. 173-190; Mönks, 2008, pp. 79-85). Gordon's concept of developing the ability to learn music has been the subject of research at Kazimierz Wielki University in Bydgoszcz for years. The aim of this research is systematic application and developing conditions in Poland for implementing E.E. Gordon's theory. The educational model developed in Bydgoszcz is mainly based on the concept of audiation. This means that audiation is the starting point of setting innovative goals for music education (Gordon, 2005, pp. 63-66, 82; Nuzzaci, 2013, pp. 263-276; Apostoli & Nuzzaci, 2010, pp. 67-75). Indeed, audiation requires from the learner a more complex mental activity than perception. Above all, permanent competence is required on two levels: differentiating and drawing conclusions. This is because audiation is only possible, when we are able to recall and understand, what we have already perceived, sensed and, eventually, differentiated (Gordon, 1980; 1999, pp. 127-130). This is crucial for achieving educational goals in this domain.

Practical and developmental activities are aimed at combining interdisciplinary academic knowledge (including theory and research) with practical knowledge in the curriculum of future early music education teachers. Academic studies of future education staff in this field needs to embrace the following key components: theory of teaching, research and dissemination (including expertise). Moreover, the key competences of a teacher of music needed to be implemented, such as theory of teaching, research (including innovations) and dissemination of incubated solutions in education (Kołodziejewski, 2012b, pp. 357-371). These assumptions are the aims of the interaction model, which constitute the statutory research field at the Faculty of Music Education of Kazimierz Wielki University in Bydgoszcz (Poland). This model provides that educational activity of the staff and students needs to follow the idea of an innovative "laboratory of audiation development" and be a strong response to the need of the currently expected mission of a "real-life university" (Trzos, 2015).

4. “e-Audiation Songbook” – core of the project

Combining academic teaching according to Edwin E. Gordon’s theory of education with teaching computer skills is beneficial for developing competences of the future early music education teachers. Developing interdisciplinary competences in students of the Faculty of Music Education of Kazimierz Wielki University in Bydgoszcz (Poland) is the aim of the work towards designing and generating interdisciplinary solutions in music teaching theory. The solution is scientific and didactic in character, but above all interdisciplinary. Electronic songbook solution, entitled “e-Audiation”, is a module of the electronic application *Music Fairytale* for working with early school children. This solution (and the entire application) has been designed by the laboratory team of students from three faculties: early school education, computer science and mechatronics, in an EU-funded competition project “*Wykwalifikowani, aktywni, komunikatywni – absolwenci UKW*” (*Qualified, Active, Communicative – UKW Graduates*) (no. UDA-POWR.03.01.00-00-K024/15) via the National Centre of Research and Development. The purpose of this solution is to use digital technologies in specialist practice of developing actual audiation during early music education. The theoretical concept of this solution was implemented by the interdisciplinary team of lecturers from the Institute of Education and Institute of Computer Science and Mechatronics at Kazimierz Wielki University in Bydgoszcz (Poland), and an external expert representing an education-research enterprise specialised in commercialisation of solutions based on the E.E. Gordon’s theory in Poland. The collaboration focused on the following tasks:

- Developing the conceptual assumptions of an electronic songbook,
- Selection (including content-based organisation) of the content package for active development of the basic music skills in children on early stages of education,
- Possibility to design quantitative educational research, which would form the basis of the proof-of-concept of the criteria and prognoses of implementing the interdisciplinary solution into the practice of actual audiation development.

Works on the application *Music Fairytale* “e-Audiation Songbook” focused on generating a final design of the interactive tool, which would use digital resources of texts, graphics, and sounds for specialist early music education with reference to the elements of the theory of music learning by E.E. Gordon. The selection of the musical contents (repertoire) for the songbook was based on the five criteria of the *Gordon’s Theory of Music Learning* (GTML):

- **Praxeology** (consistency with the methodology of action on early stages of education, requirements of the standard curriculum and theoretical assumptions of E.E. Gordon)
- **Tonal content** (including a variety of scales: major, Dorian, Phrygian, Aeolian, harmonic Aeolian)
- **Rhythmic content** (including a variety of meters: simple/compound, duple/triple)
- **Performance** (including different presentation of the same content: vocal monophony/polyphony, instrumental: harmonic/melodic) and
- **Typological criteria** (content based on types of actual audiation: listening, reading/writing, performing/creative skills and improvisation).

The solution is still being developed, but part of the material has already been prepared and sent to practicing experts for evaluation. The main element is the assumed high level of digital innovation and aesthetics of the solution (graphic design, quality of the file, navigation) – photo 1.

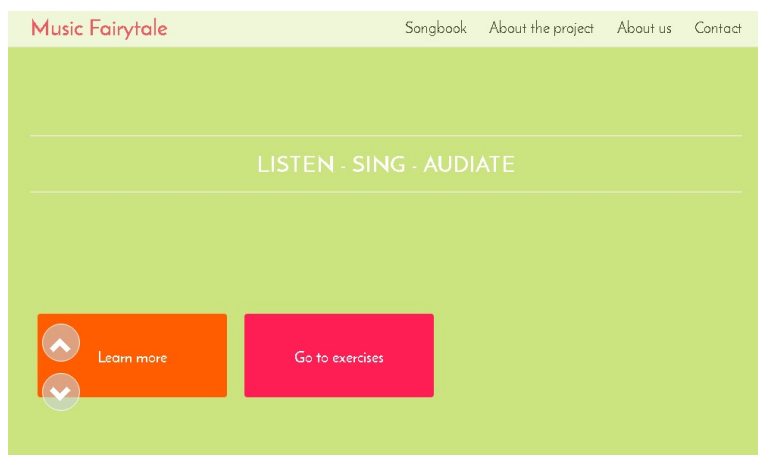


Photo 1. Homepage of the Music Fairytale project*

*The application (including the “e–Audiowanie Songbook”) is in Polish

The methodological material (tonal and rhythmic content) to be included into the Gordonian “*multibook*”, needs to be useful in education and dissemination. Moreover, the exercises have to be interactive, in order to appeal to children. Such a musical *multibook* is a form of presenting and processing the collected tonal and rhythmic content in form of tasks that develop actual audiation. The key criteria of organising the teacher’s activities based on the collected material refer to the basic theoretical background (GTML). The reference is mainly to the key types, stages and levels of audiation, according to which the suggested types of tasks (exercises) have been selected in order to develop musicality in children (Table 1):

Theoretical reference (GTML)			Structure of the “e-Audiation Songbook” in the <i>Music Fairytale</i> application				
Audiation type	Audiation level	Audiation stage	Task	Content of the musical exercises	Form of audiation	Scope of exercises *	
Listening	Aural-vocal; Verbal associations	Differentiating	Differentiating structures of melody and rhythm	Vocal presentation based on tonality (major, Dorian, Lydian, Aeolian, harmonic minor)	Actual audiation	I	
				Vocal presentation based on metre (simple/compound, duple/triple)			
	Aural-vocal; Partial synthesis; Comprehensive synthesis	Differentiating	Developing sensitivity to the timbre of musical instruments	Associating and combining the sound of instruments (timbre and register)	Instrumental presentation: melody line; bass line; chords	Audiation of the inner instrument (Gordon, 1984; Bonna, 2013, pp. 81-86; Trzos, 2011, pp. 221-230)	I
				Verbal associations		Differentiating	Associating and combining assimilated musical motives
Reading/ Writing	Graphic associations Comprehensive synthesis	Differentiating	Reading music with awareness of the musical context (musical phonemes, musical syntax)	Exposure to the notation of melody and rhythm	Notational audiation	I, II	
Reading Listening Performing (regular)	Graphic associations; Comprehensive synthesis	Differentiating	Singing single motives and larger constructs based on relative solmization and rhythmic solfeggio	Vocal presentation of notation and performance based on tonality (major, Dorian, Lydian, Aeolian, harmonic minor)	Actual notational audiation	I	
				Vocal presentation of notation and performance based on metre (simple/compound, duple/triple)			
Listening Performing (creative)	Dialoguing	Making conclusions	Performing variations with progression in various scales and meters	Vocal presentation of performance based on tonality (major, Dorian, Lydian, Aeolian, harmonic minor)	Actual audiation	I, II	
				Vocal presentation of performance based on metre (simple/compound, duple/triple)			
Listening Performing/ creating and improvising	Dialoguing	Making conclusions	Processing single musical motives based on relative solmization and rhythmic solfeggio	Harmonic accompaniment Instrumental presentation of the bass line Vocal presentation (in the relative method)	Actual audiation of the inner instrument	II	
	Dialoguing	Making conclusions	Elements of vocal improvisation with awareness of the musical context (including Tonic, Subdominant, Dominant)			I, II	
	Creating and improvising						

Table 1. Theoretical structure of the “e-Audiation Songbook” in the Music Fairytale application

* I – Practical skills, II – developing and understanding theoretical terms and symbols in music

Source: own study based on: Trzos, 2015, pp. 130-131; Zwolińska, Gawrytkiewicz 2009, pp. 17-20.

Conclusion

The *Music Fairytale* „e–Audiation Songbook” application is under development. However, it has already been established that the generated didactic solutions will be sent for development to professional editorial centres. The aim is to turn into professional products the students’ solutions in graphics, quality of musical files that meets the requirements of content conversion, and speed of data access. The solution itself is fully customisable in terms of pace and difficulty level of the exercises (including error correction). One of the significant assets of this *multibook* is combining the included contents with the continuously updated Internet platform, containing educational packages for each level of learning. Otherwise, separating the contents of the multibooks from the teaching curricula might hamper the process of music teaching. Therefore it would be beneficial to combine the *Music Fairytale* “e–Audiation Songbook” application with the only currently available, alternative curriculum based solely on the theory of music teaching by E.E. Gordon (Zwolińska, Gawryłkiewicz, 2009). This way, the criteria proposed in the application solution will be fully adjusted to the Polish context.

The introduced innovation can stimulate changes in the model of the present day school, including music education. Analysing current trends in the development of educational technologies, we can expect the future school to be ICT based, and therefore up-to-date; focused on developing both knowledge and practical skills by targeted implementation of information and communication technologies into the functional, educational space. Software has become indispensable in everyday life (Sitarz, 2006, p. 88; Jennings, 2005, pp. 225-238), however, the developers of the *Music Fairytale* “e–Audiowanie Songbook” application are convinced that even though digital technology can enhance the learning process, it will never replace personal interactions between teacher and learner, which continue to be the focus of attention in the educational space (Al-Zaidiyeen, Mei, Fook, 2010, pp. 211–218; Hennessy, London, 2013, pp. 15-24; Cutrim-Schmid, Whyte, 2012, pp. 65-86; Parkita, 2014, pp. 67-68; Wojtas, 2004, pp. 99-102; Nuzzaci, 2013, pp. 270-275).

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