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Ewa Anna Zwolińska
ORCID:0000-0002-4256-0319
Kazimierz Wielki University in Bydgoszcz

Opinions of Early School Teachers on the Use of Information Technology When Learning/Teaching Music Through Audiation

KEYWORDS

teaching music, early school education, audiation, ICT, music skills

ABSTRACT

This article focuses on the changing paradigm in music education that results from the development of audiation. In 2004, at the Kazimierz Wielki University in Bydgoszcz, in the specialization of early school education, students started the course based on the assumptions of the theory of music learning by Edwin E. Gordon. For 15 years, the implementation of the curriculum in the Innovative Music Education module, the course was evaluated in six problem areas: 1. Mental value of audiation skills; 2. The value of the process of learning music through audiation; 3. The value of the three-step process of learning music; 4. The possibility of optimizing the teaching process; 5. Usefulness of the studied designs; 6. The ability to learn music. After fifteen years of implementing a strategic plan focused on the audiation model of music education, there have been changes in the minds of students, and the requirements for raising technical and practical skills have increased. For this reason, it was recognized that information and communication technology (ICT), which is carefully planned, designed and integrated with good pedagogical practice, can support the motivation to learn music and improve its quality.

Introduction

The use of information and communication technologies (ICT) can become an important strategy in maintaining the quality of teaching music, the main objective of which is departing from teaching methods based on handbooks and oriented at teachers, and moving towards more interactive approaches that are focused on students. At the Kazimierz Wielki University in Bydgoszcz, teachers promote the use of educational software in all kindergartens and primary schools that have access to the Internet. The University offers a program that supports the development of the audiation of preschoolers and primary school students. Using this tool in the process of learning music through audiation as the starting point, it can be used to measure the quality of the results achieved, ensure some control over those results, facilitate the development of audiation and stimulate students' musical interests. The research participants included people who are interested in IT and would like to check the effectiveness of music education through audiation.

Education is a way of solving social problems (Worten, Sanders 1987: 4), so we have to try to improve the quality of education (including teaching music) at university faculties of pedagogy so that we can activate the intellectual potential of small children. We are looking for the answers to the following questions: 1) Will conducting music classes in preschool and primary school with the use of information and communication technologies (ICT) result in the expected change of the paradigm oriented at the development of audiation?; 2) Will the use of information and communication technologies in the process of learning music improve the value of students' achievements as compared to the traditional pedagogy of music?; 3) How do teachers evaluate the usefulness of a computer program in practice in the classroom, and do they think that using ICT will improve the quality of the process of teaching music?; 4) Will the use of ICT increase students' interest in learning music?

Methodological assumptions

The objective of the research was to learn the opinion of early school teachers on the usefulness of ICT in teaching/learning music through audiation. The researcher carried out half-structured (irregular and simplified) interviews with people who had graduated from the specialization: early school pedagogy with the module "innovative music education" at the Kazimierz Wielki University in Bydgoszcz. The selection of the sample was purposeful because the opinions were expressed only by the graduates who knew the assumptions of the theory of learning music by Edwin E. Gordon. Fifty teachers took part in the research. They teach music in kindergartens or in classes

I-III of primary school, and the length of their teaching experience varies from 1 to 10 years.

The way teachers function depends on the properly selected evaluation procedures, methods and tools, and on the contexts accompanying such evaluation. Evaluation is understood as the analysis of the content carried out within the studies associated with the assumed objectives of music education of small children. We are looking for the answer to the following question: How can we investigate music interactions and experiences of children, students and teachers? It was assumed that we would obtain such knowledge if we introduce a computer program into the process of learning music. We believe that, through the stimulation of audiation development (thinking with music sounds), we will be able to develop students' general intellectual abilities, which may radically change the common music education. The implementation of this solution will modernize the ways of developing the musicality of small children in informal education, as well as the methods of teaching/learning music in formal education, which will be reflected in social effects.

In the process of the development of audiation, flexible memory is necessary. Such a memory is open to the exchange and extension of various elements, including their deformations. This way of our memory's functioning shapes our musicality, and its perfect form is vocal communication in which we have to formulate our thoughts and adjust to others. Such adjustment is a very complex process possible due to the cooperation of different areas of the brain that are mainly located in the frontal lobe, the parietal lobe and the hippocampus. These areas participate both in "recalling" what has happened before, and in imagining future behaviours (Schacter, Addis, Buckner 2007).

The computer program is to support and facilitate collecting music themes that will later be selected, assessed and applied by the users. Such a program would be a useful technical "tool" that makes it easier to learn the world of sounds. Audiation can be learnt before the child is able to make music on a properly adjusted level. The problem is important because it refers to the way of educating early school teachers that encourages them to use music education at the early education stage.

Scope of evaluation

Intellectual value of the ability to audiate. Similarly to all other areas of education, we can gain music knowledge and skills in the process of learning. In order to realize what this process is about, it is enough to memorize a series of themes and perform them many times so that we can remember and sing them easily. Our brain should deal with the task easily, but we have to remember about its three weaknesses: 1. it does not learn well under pressure; 2. It is reluctant to learn pure data, as it

considers them uninteresting; it quickly forgets. Learning music is not a one-way transfer of content to the brain, but it also requires an understanding of the content. When we realize what happens when we learn music; how the information we want to learn is acquired; and what the power of human audiation is, we should understand what music means to us.

The changes happening in synapses (contact points of cells) follow one basic principle: the connections that are often used become stronger, and those which are used less frequently become weaker. Thus, if the neurons in the brain cooperate according to a particular model, the nerve cells have to "memorize" that scheme. They do this by the mutual adjustment of their synapses in order to perform a specific activity: singing a melody. Sounds are somehow recorded in the structure and connections of the neuronal network (probably somewhere "between" the nerve cells), and, to recall them, we have to stimulate our minds. We know that the better the connections among the neurons are, the easier it is to do this, but we want to learn the way our brain functions to understand what has been "stored" in it and what, instantly changing, circumstances it can adjust to during musical activity (Gordon 1999: 481, 500).

The value of the process of learning music through audiation. The neuronal system of processing sounds can become very effective because of several reasons: it is flexible, it does not need an external control and it adjusts itself to various conditions. However, since the processes of the neuron restructuring are subject to particular biological rhythms, we do not always learn effectively. The influence on the quality of making music is particularly noticeable when we are nervous, excited, full of emotions, and unable to deal with stress. In such situations it is not only difficult for us to learn melodies, but we are even unable to sing or play some of their fragments. It has been proven that, when we are surprised, our brain is provided with noradrenalin which stimulates the areas of brain responsible for increased concentration (Hermans et al. 2014). Later, cortisol appears, i.e. the hormone of stress which blocks the unnecessary activity of nerve cells, i.e. forces the organism to suppress a destructive response to the problem (Strelzyk et al. 2012). Because of this we can focus better on only one issue.

It turns out that only emotionally loaded contents are interesting for the brain, while pure facts are boring (McGaugh 2013). The brain adjusts to various situations, it dynamically responds to the circumstances and acquires new information, but, without understanding, it is unable to memorize more than twenty items. Its functioning is not about learning information by heart just to store them, but about ordering the collected data. The meaning of a specific series of themes results from assigning them to a function, because in this way we remember sounds in a particular environment. The smallest semantic unit in music is a theme in which the relations among sounds and linking them in a consistent whole are important. It is worth emphasizing that

we need a diversity of the information provided so that our brain can place it within a common context (Smolen et al. 2016). Such a meaningful concept enables us to order music categories and understand mutual relations among them.

The brain learns quickly if it receives proper data on the basis of which it creates schemes of a particular phenomenon. In the case of mapping, i. e. marking details, new information is quickly connected with the existing categories, which probably takes place without the participation of the hippocampus that is responsible for training memory (Coutanche, Tompson-Schill 2015). The brain organizes our knowledge very well, but it only shows its true abilities if we do not impose meaningless tasks on it. People who deal with music education have to know the elements that may facilitate the development of audiation. Stress supports learning music if it is positive, brief and unexpected. It has been confirmed that the students who are aware of what stress is, cope with it and are able to control it (Thorne, Andrews, Nordstokke 2013). We learn music best when teachers demonstrate a positive attitude towards it, and when they can arouse interest and good emotions among their students. This is more important than the very contents of the lessons.

The value of a three-stage process of learning music. Singing seems an easy activity that includes processing sounds and moving according to the musical pulse, but actually it requires the cooperation of many areas of the brain. While formulating and expressing a musical utterance, we make decisions the mechanisms of which are unknown to neurologists, as almost all parts of the brain participate in them. There is no particular "decision centre," and shaping one's own opinion is carried out in a bottom-up manner. First, the areas responsible for emotions become activated, then – the areas responsible for rational thinking and information processing, and finally the decision is made which is reflected in particular actions. This three-stage process has been specified as a new model of AIM: affect – integration – motivation (Samanez-Larkin, Knutson 2015).

The beginning of the direction of behaviour is located in the so-called midbrain, near the back of our neck, i.e. where the spinal cord ends and the brain begins. The mid-brain is a part of the brainstem that is linked with the cerebellum, diencephalon and the pons (Jaśkowski 2009: 30), and, although it is only 1.5 cm long, it is an important "switch" that controls our movements (mechanic reactions), breath and reflex (e.g. turning the head and eyes towards a sound) (Beck 2018: 189). The mid-brain activates the initial phase of action for two neural routes that determine our principal emotional choice: we decide whether we aim at achieving an objective (getting a reward) or we shall perform the tasks superficially, just to have them done (and avoid punishment).

A logical consequence of the integration of emotions and facts is motivation – a state in which an organism is stimulated or encouraged to act. The result of the whole decision-making process is sent to the motor centres of cortex in the form of particular patterns of activity. Particular schemes of movements needed for action in a particular area are worked out by the cerebellum which is responsible for coordination and balance, evaluation of the duration and height of sounds, differentiation of similar words (themes in music), as well as verbal tasks, such as matching the proper verb with the thing (Bower, Parsons 2003).

The AIM model is well-balanced (stable) and works according to the plan: the brain quickly decides what it likes and then adds arguments to justify the decision made on the basis of emotions. Thus, first emotions appear, and then we take up intellectual work. This model enables us to function in unclear circumstances and take up particular initiatives.

Optimization of the didactic process. People's decision-making system analyses, in the rational areas of the brain, many different music patterns and impressions to confirm the first, emotional impulse. However, the capacity of those areas of the brain is limited, and making music consists in processing sounds in a specified rhythm. The inability to process the information under the pressure of time results in the state which, in neuropsychology, is called cognitive dissonance. It is a feeling of unpleasant psychological tension which results from the difference between one's convictions or attitude, and one's behaviour (Inbar, Botti, Hanko 2011).

In many cases, we rely on our intuition. It often depends on the meaning of the problem, but, even if, in musical activity, we follow strict rules, in front of ourselves we are only responsible emotionally for the decisions we make. It was concluded that the more properties and good features we take into account, the better decisions we make, provided that we make relaxing breaks before we choose something (Dijksterhuis et al. 2006). Also, we should remember that intuition is not always irrational, and in music tasks it is necessary and often more beneficial than a conscious thought.

While fulfilling the process of developing audiation, we gather various music themes, but, since it is necessary to compare them with one another, we create categories so that we do not have to analyse them individually. In this way, we make choosing easier and we should be more satisfied with what we decide. When students choose patterns, it is easier for them to choose from arranged logical series than from chaotic collections. No matter what the categories are, it is important to prepare such categories. Even if the collection of themes is very large, it is possible to make a choice if we divide the collection into clear categories. For our brain it is not important what themes we choose, but how we feel about the decision we made. However, it is worth

noting that the deeper our knowledge of a topic is, the more important it is for us to recognize the emotional, intuitive approach to this issue (Beck 2018: 222).

The usefulness of audiated patterns. Our brain is a master in creating and re-creating thinking patterns which, on the one hand, make it easier for us to act, and, on the other hand, are a trap, because they encourage us to spontaneous behaviours. The human brain constantly shapes the frames of expectations, and then checks whether what it experiences matches those expectations. Nerve cells in the brain either accept or reject activities, and an individual decision of a cell is unimportant, since what matters is the joint result of their activity. Together, neurons create a strong electric field which can be measured from outside the skull with the electrodes attached to the head. Such an examination is called electroencephalography (EEG), i e. a record of (bio)- electrical activity of the brain (Beck 2018: 231).

From the point of view of the brain, the most important is that its audiation schemes and patterns of behaviour are stable. Templates used in understandable and repeated situations, which help to create proper compositions that facilitate the learning of music, are a perfect strategy that helps us to immediately recognise the circumstances. However, it does not mean that music is a series of consequent sounds that can be efficiently used as reliable patterns. We cannot achieve internal stability without adopting external stimuli. In the process of the development of audiation, the brain is constantly trying to recognise and differentiate themes and arrange them into phrases and sentences. Using adequate prompts, the brain perfects useful patterns, but the less it understands, the more it is prone to be deluded by superficial solutions, as a result of which we construct misshapen and non-melodious categories.

For example, it is known that when we do not feel stress or fear, we are much less prone to various overinterpretations, and the less we control the situation, the more often we notice connections that do not exist (Simonov et al. 1977). The human brain is constantly looking for connections and combining them into a whole, so even in an accidental series of sounds it can find a pattern which does not actually exist. We are constantly overinterpreting the surrounding music and we allow seeming relations to deceive us. Thus, the first problem is that we create mental categories too quickly, and the second problem is that we question them too slowly. We tend to stick to our subjective image of music, which is often based on stereotypes that can only be useful if we are able to give them up.

The ability to learn music. In the first months of life, babies do not differentiate particular patterns, but if they often hear singing, in time they recognize them without the necessity to train this skill. A baby's neuronal network is able to process any pattern based on totally equal rights, but the older the child is, the more often he/

she comes across the same themes in particular tonality, measure, tempo, dynamics and articulation. Thus, we can conclude that the brain gradually loses the clarity of its intentions and starts to prefer some sounds at the cost of others. In the man's music development there are critical (sensitive) periods, which are characterized by increased neuronal sensitivity to environmental stimuli of particular events. Sensory experiences, which are acquired at those periods, result in permanent neuronal changes, depending on the acquisition of different types of knowledge and skills. The condition that is necessary for the development of audiation is the ability to notice tonal and rhythmic differences, which is why children's early music education is so important (Gordon 1997: 14).

In later years of life, we are still able to learn to sing, play an instrument or make sequences of movements, but these skills have to be improved in other ways. It is true, however, that the brain changes with age, and the older we are, the less our brain weighs (Fjell et al. 2009), and the less connections among its areas we have (Sulivan, Pfefferbum 2006). While analysing the activity of the brain in the group of people over 65, researchers concluded that the areas of the brain which were not active among 20-year-olds were used by the older people. For example, while memorizing words, elder people activated the area of the prefrontal cortex, and younger people mainly used the areas located in the back of the brain (Davis et al. 2008). Such research is usually carried out with the functional magnetic resonance imaging method (fMRI), but researchers still do not know what exactly the obtained images of the brain activity mean.

Since the capacity and pace of processing information decreases as we grow older, the achievement of the results similar to earlier ones requires the involvement of more brain areas, even in simple tasks. Younger people are able to perform the same activities faster and more effectively within smaller networks (Grady 2012). The size of the collection is what determines how successfully a task shall be performed. Age is of secondary importance (Rast 2011). To a certain degree, music experience gathered in the course of life may somehow replace the youth's better performance. For example, when we are to memorize particular expressions, the brain reaches for "youth" activation patterns (Degen, Schröder 2014). The human brain learns very well at any age, and if it uses sounds audiated in the past, it does not have to use additional areas to solve simple tasks because it maintains its flexibility and ability to adjust until the end of life.

For many years, scientists erroneously believed that, with age, the brain undergoes irreversible deterioration and is unable to learn anything new. It turned out, however, that even if we are mature we are able to master complex sequences of movements. For example, people over 50, during a three-month training period, learnt how to juggle with three balls, and their results were identical to those of 20-year-olds, although

the latter learnt it faster. It turned out that, because of the training, in the brains of the elder people structural changes took place. The weight of hippocampus, which is responsible for memory, increased, as well as the mass of the visual cortex. Also, the reward system, the nucleus accumbens, is enlarged (Boyke et al. 2008). The ability to undergo structural changes is also visible in using speech. People who use several languages are in the best situation. For example, people over 70 who spoke two languages had better connections between the front and back areas of the brain, and between the brain hemispheres, than people who only used one language (Luk et al. 2011).

On the basis of the research which is being carried out, scientists believe that due to the increased density of neuronal fibers, particular areas of human brain can cooperate with one another more effectively. Perhaps this is why the brains of people who use two languages are more efficient in old age, as a result of which those people are better in tests for concentration and rapidity of reaction (Kroll, Bialystok 2013). It is highly probable that such phenomena also occur among people who audiate, e. g. play musical instruments. Thus, we can conclude that the abilities of a mature neuronal network are high, and the decreased pace of processing information is compensated by the network's extensive structure. The ability to implement changes is maintained until old age, as a result of which people can adjust to new stimuli until the end of their lives.

Opinions of the participants of the research concerning the quality of music education with the use of information and communication technologies

The opinions quoted below refer to the usefulness of ICT during music lessons. All the participants of the research agreed that ICT tools are useful, but they emphasized that everything depends on the kind and nature of actions. They agreed that new technologies can be the key to more efficient acquisition of music through audiation. The bases for expressing such opinions were varied, which is justified by the following statements:

Particular themes and their series can be presented both through sounds and music notes.

ICT can provide the students with necessary musical information in the proper order, so that interactions between the teacher and the students are more dynamic.

Using ICT is very popular today, and it can be really inspiring…

Using ICT in the process of learning music through audiation improves the efficiency of education based on modern technology…

Traditional pedagogy is not enough today. Through ICT, we introduce students into the world of music in a way that is natural for them and raises their interest.

Through ICT, each student can shape their way of singing on their own. In traditional methods, children sing with the accompaniment of the piano or learn songs played from CDs or DVDs without understanding their contents. They repeat the themes without the awareness of tonality and measure.

Some teachers of music agreed that, by using ICT, they can achieve a better balance between pedagogy using ICT and traditional pedagogy. Here are their replies:

To a certain degree, the fulfillment of some music ideas with the use of ICT may replace traditional pedagogy, but it does not refer to the cooperation in a choir or an orchestra.

It is worth using ICT in teaching music, but the quality of the obtained results depends on what we teach and what contents we refer to. The practice of singing in a team requires regular group exercises.

ICT may help, depending on the forms and contents used during music lessons. When the students differentiate the sound of themes in different tonalities and measures, with the support of ICT they can listen to selected items many times, and, while singing them, they can learn about the mistakes they make.

If the themes demonstrated through ICT are properly selected, their mastering is easier, and singing them frequently develops audiation and facilitates shaping a good voice.

Using information and communication technologies during music lessons is a substantial element of the process of learning music.

The students and the teachers can check the quality of particular performances; they find out where they made mistakes and they can correct themselves quickly.

The students develop the ability to sing in various scales without the necessity to give theoretical information by the teacher.

(…) The teacher plays the major role in designing a music program, but ICT are useful in doing exercises at the level of differentiating and concluding.

Music lessons require the teacher's instructions, but ICT make it easier to perform particular tasks.

Music has to be taught by competent teachers who know when, why and how to introduce knowledge through ICT to encourage the students to audiation.

Certainly no music lesson can be conducted without a music teacher. Educators are necessary, both because of the need to demonstrate music skills and because their interactions with students are important. Developing vocal skills in interpersonal contacts is more important than using information and communication technologies that would never replace playing music and singing with others. However, it is worth using ICT to show the students important aspects of music and mistakes which they can correct. The students who have learnt the theory of music and apply the proper order of actions that develop their music skills, often see the value of ICT within the tonal and rhythmic scope.

It was recognized that ICT may facilitate music teachers' work (especially those who do not play an instrument), but it was emphasized that it is advisable for them to be able to play the piano. Everyone agreed that ICT may improve their quality of work, but it depends on the contents they teach and on the availability of proper software that supports audiation and facilitates following thematic instructions. The quality of music education should not be measured with the degree of integration with ICT, but with the quality of audiation skills adjusted to the students' abilities and needs. Here are some of the utterances of the research participants:

The quality of teaching music depends on the teacher's competences, and not on using ICT.

The quality of music education cannot be measured with the degree of the integration of ITC with teaching music, because audiation skills are independent of ICT and they cannot be replaced with anything.

The quality of music education depends on the applied teaching methods and on the fulfillment of contents in the proper order.

Information and communication technologies shall not change bad teaching into good teaching. A teacher has to know how and in which order he/she should introduce music issues to facilitate the progress in the development of audiation.

ICT are only tools that facilitate the process of the development of audiation. They shall be useful provided that the teacher knows the theory of learning music and knows what, when, why and how he/she should teach particular elements to the students.

Interpersonal relation is crucial, but ICT may improve the efficiency of teaching music.

Opinions of teachers on the motivations to learn music with the use of technological devices

Using ICT may improve the quality of learning music. The ability to compose music with the support of a computer, and the Internet as the source of information and a place to share music, were appreciated the most. However, what is needed is access to the proper music software, teachers' technological competences, and, first of all, the knowledge of the order in which learning music should take place. The students will be motivated to learn music with the use of ICT if they feel that their audiation abilities are improving. The utterances mainly refer to the effectiveness of learning music, and only to a low degree – to the atmosphere during the lessons.

Due to the application of information and communication technologies, we can visualize music in a music record and thus understand it better.

Composed series of themes not only sound properly, but they are also presented in a record. Due to the application of ICT, we can develop hearing-vocal and notational audiation.

ICT included into the process of developing audiation increases one's interest in music.

Information and communication technologies make me learn music faster and with greater pleasure.

ICT used in the process of learning music through audiation help in composing music and achieving good results.

A good program for teaching music provides teachers with the necessary information.

When using ICT, we always hear the proper sounds.

Performing particular music tasks may be practiced by repeating them on one's own with the use of a computer program.

Using ICT in the process of developing audiation significantly improves the ability to sing and play an instrument.

Due to the use of ICT, it is possible to correct the tonal-rhythmic aspects of music – during each repetition of a melody, intonation and pulse are proper and same.

Even those people who are not good at using ICT emphasize that such technologies increase the students' motivation to learn music.

ICT may improve the quality of individual hearing, playing and composing music, which is very important in team practices, such as choir singing or playing instruments in an orchestra.

All the researched teachers admitted that the ability to sing, play an instrument, read notes, create and record melodies make it possible to conduct music lessons in a convenient, natural and competent manner.

Students want to participate in music activities and experience changes in the development of audiation.

The teacher must use such methods of teaching music that shall be compliant with the student's abilities. Using ICT may support the development of singing skills, but singing cannot be replaced with electronic sounds.

It is the teacher who gives the students detailed information on making proper sounds with their voice, breathing, dynamics, pace or articulation.

Information and communication technologies can support the choir practice when we individually learn the melodies of particular voices.

ICT cannot replace vocal or instrumental practice because, without practicing, the students cannot see what mistakes they make. However, the presentation of how to make particular melodies properly is the goal at which they should aim.

ICT do not replace the teacher, but they can support the whole process of teaching/learning.

Tonal, rhythmic and melodic series demonstrated through ICT are performed by the students with their voice, but due to ICT they can repeat these series many times both in the classroom and at home.

Using ICT intentionally, it is easier to identify difficulties in learning music, and proper and fast reactions help to avoid the obstacles that make it impossible to develop music interests and satisfy related needs.

ICT stimulate the development of audiation skills which are necessary in each type of music activity.

All the researched people admitted that they are more motivated to learn music if, in the process of audiation, they use ICT, because they feel confident when they make vocal exercises they can hear many times.

Conclusion

Music teachers are willing to learn audiation processes with a higher degree of complexity than recognising distances between sounds (intervals) or singing, although these processes are quite difficult, too. Our question is: How can we assess the value of emotions, feelings, personality traits, musical intelligence or creativity? We find out that when professional musicians improvise, their occipital bending in the back of their head is activated Bengtsson, Csikszentmihályi, Ullén 2007), and that nucleus accumbens is activated during making risky financial decisions (Knutson, Wimmer, Kuhnen, Winkielman 2008). Also, scientists have proven that the amygdale is not only activated when we are experiencing negative emotions, but also when we are expecting a financial reward (Hommer, Knutson, Fong, Bennett, Adams, Varnera 2003), we are listening to emotional, exciting music (Lehne, Rohrmeier, Koelsch 2014), and even when we are looking at some photos of smiling people (Cunningham, Kirkland 2014).

The students of early school pedagogy at the Kazimierz Wielki University in Bydgoszcz, who know the theory of learning music by Edwin E. Gordon and have some audiation experience, evaluated ICT in a positive manner, saying that such technologies may facilitate the process of music education. The students admitted that they feel motivated to introduce the change of paradigm in their didactic activities with the use of a computer program that facilitates the performance of many music tasks. They said that teaching which encourages the students to engage in audiation is proper and valuable because it may result in a model oriented at the student who replays and creates music.

Fifteen years of experience in teaching music through audiation have confirmed the efficiency of this educational approach and it has become an impulse for the creation of a computer program that makes it possible for us to prepare the foundations for a new method supporting the child's musical development. We believe that creating IT infrastructure and teaching music through ICT will facilitate the process of developing audiation skills that does not consist of using CDs, video or DVD players to make audio and visual presentations. Today we do not need to equip music rooms with computers, because the students use their own smartphones that only need proper applications to develop audiation under the supervision of a teacher.

We have to define program and technological requirements necessary for the fulfillment of sequential teaching of music. ICT tools are for everyone, but they must be properly promoted so that they can facilitate the development of musicality. There is no doubt that without a competent teacher the students will not listen to audiate, and practical activities supported by ICT are more attractive and more efficient because they shape a particular way of replaying and creating music. For example, only with

the use of proper computer programs can the students correct their performance in terms of intonation and rhythm. Also, such programs help them differentiate tonality and measure, and they enable them to get to know different styles of music. During the fulfillment of such hybrid (combined) system of teaching, we also make it possible for the students to create music in the social media.

ICT alone will not change the school music education, as we also need competent teachers who know the order of activities necessary for shaping audiation skills. Students of early school pedagogy must learn the ways of teaching music through audiation with the use of the software created for this purpose, so that they can adjust to the way our digital society functions. It is necessary to reject old and inefficient ways of teaching/learning music, which requires the restructuring of curricula and pedagogical approaches in a way that would help the teachers fulfill activities supporting audiation (thinking with sounds). Also, it is necessary to select evaluation tools that would verify the efficiency of introducing ICT within the scope of the qualifications for teaching music that will ensure taking up suitable music activities.

This article suggests that the quality of the students' music experiences may be better if we introduce a more holistic approach that uses ICT in preschools and schools. Competent teachers of music ensure high quality educational services, and the pedagogy students they teach may learn how to efficiently develop audiation skills of preschool and early school children. The professional development of teachers at an early stage of education must follow small children's developmental needs and the rapid changes in information and communication technologies. The universities that educate early education teachers should constantly identify and promote ICT tools which may support the development of audiation, both among the teachers and among the students. In order to evaluate the quality of music education through audiation supported by ICT, further scientific research is necessary.

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ADDRESS FOR CORRESPONDENCE

Ewa Anna Zwolińska
Kazimierz Wielki University in Bydgoszcz
e-mail: ewazwol@ukw.edu.pl