

# Multidimensional approach to music education: professional learning in the digital age

## Многомерный подход к музыкальному образованию: профессиональное обучение в цифровую эпоху

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**Abstract:** Digitalization process stimulates changes globally including art and particularly music. Modern computers and digital music instrument tend to replace all kinds of traditional music professions such as composer, conductor, performer. While the digital tools redesign the reality scholars are giving the forecast about radical restructuring all the system of music professional education. Following the theory of logic in sociology of Alexander (1982) and looking on the music education through the lenses of multidimensional approach it is crucial to point the strong correlations between the elements of this system, that could be seriously violated in a case of broken the balance among all of them.

From such point of view the problem of preparing specialists of music professional learning becomes highly relevant. In these frameworks the objectives were stated: i. What is the main trend for the structuring of the human musical activity in the digital age by using multidimensional approach? ii. Which dimensions of music professional learning can be strengthened by digital tools?

The methodology of the research was based on the quantitative and qualitative study. In regard to the first objective the research question was pointed out: Which correlation features school children's awareness of music meaning, and their self-involvement in the musical activity? The data were collected by University students during their music teacher practice in a secondary school. In total 76 children from three schools participated. The study was based on the method of the survey with open- and closed-ended questions. The hypothesis was proved by the statistical Pearson's  $r$  method implemented by the structural equation modeling (SEM), which was executed by the software "Оnix". For the second objective the method of interview was chosen. Nine university teachers were asking questions about the future of music education due to the spreading digitalization.

Main results demonstrated the high level of identity among schoolchildren's responses from all three schools confirmed by the methods of median and standard deviation. The analysis of the Pearson's  $r$  results showed positive correlation, what mean schoolchildren, who are able for deep understanding of meaning in the musical pieces have regular self-practice in music. In the interviews teachers pointed to the usefulness of digital tools for making music with applied goals or for getting self-education.

Based on the research results were concluded, the meaning of music is the pivotal concept, which can be pointed as the main trend of structuring musical activity. Fostering the children's ability to understand it in traditional as well as in digital music pieces is crucial for the balance of all the cultural environment's dimensions. Consequently, the professional learning of music needs to maintain the core of artistic studying such as personal music perception and ability to describe it in the terms of art in order to preserve all the unique elements of the human culture.

**Key words:** music teacher, digitalization, professional training, art, multidimensionality

**Introduction.** Digitalization process stimulates changes globally including art and particularly music. Radical changes featured our life today, but they are not evenly affected everywhere. Today somebody can find a variety of ways for teaching music in general school from the very traditional Karl Orf's system with elementary instruments children's claps and spans (Chao, 2019), training musical skills by playing wood instruments to creating digital sound by laptop (Bauer, 2014). While some teachers follow fundamental approach in music other encourage their students to experiment in the digital lab (Cheng, 2019).

In the last decades several devices and software applications were produced in order to enhance the making of music. Multifunctional working station Korg i3 provides fully arranged accompaniment, sounds and even chord suggestions for easy music composing. The device BioMuse is an incredible instrument for reading of human's brain activity, such as neurons movement for producing sounds (Shirieva & Dyganova, 2020). Digital musical instruments

synthesize sounds, which reproduce any wood, brass or percussion classical instruments. Using all these instruments in a complex allows replacing the common musical professions, such as composer, performer, conductor and even musicologist (Karkina, 2020). While the digital tools redesign the reality scholars are giving the forecast about radical restructuring all the system of music professional education.

Researchers note the fast changing of the nature of jobs due to its automatization in the digital age tend to redirect the education objectives. In modern reality students need to be able to build specific skills to learn and relearn promptly. Multidimensional approach in education helps students to keep their minds open for self-learning outside the classroom, promote their awareness in methods of improving thinking skills. What is more the value of multidimensional approach in helping students to uncover the complexity of their own identities” (Tsetsura, 2011). The arguing of this issue can encourage discussions about the significance of diversity in social life globally, and in regard to subject area directly.

Following the theory of logic in sociology of Alexander (1982) and looking on the music education through the lenses of multidimensional approach it is crucial to point the strong correlations between the elements of this system, that could be seriously violated in a case of broken the balance among all of them. The system of human music activity consists of several levels: amateur music-making, pop art, music fan, academic level. The digitalization in music industry can bring disbalance among all these elements.

The key factor in keeping balance between a person and nature by the means of music is the average level of the musical intelligence in the society. The active listening to music, imitation sounds, sensitivity to rhythm and emotional perception are irreplaceable in thinking creatively and discovering knowledge in any field. The majority of Nobel Prize Winners demonstrated the real passion for music, as well as Albert Einstein loved to play violine and took this instrument with him everywhere. If the music education will be available for only the small part of the society the cohort of such persons will crucially decrease, what will have negative effect on human intellectual capacity.

From such point of view the problem of preparing specialists of music professional learning becomes highly relevant. In these frameworks the *objectives* were stated:

- i. What is the main trend for the structuring of the human musical activity in the digital age by using multidimensional approach?
- ii. Which dimensions of music professional learning can be strengthened by digital tools?

*Methods.* The methodology of the research was based on the quantitative and qualitative study.

In regard to the first objective the research question was pointed out: Which correlation features school children’ awareness of music meaning, and their self-involvement in the musical activity?

The data were collected by university students during their music teacher practice in a secondary school. In total 76 children from three schools participated. The study was based on the method of the survey with open- and closed-ended questions.

The first survey asked school children to choose the characteristic from the list of variants of explanations of the music piece, which was listening on the lesson. For the experiment the music piece wrote by R.Schuman “Erster verlust” (“The first loss”) was chosen. The list of six variants was designed in accordance with the learning goals.

#### Variants of the music piece meaning description

- I remember the *first loss in my own childhood* when nobody was able to soothe my tears.

- This music is very sorrow. The slow *tempo and minor key convey* a mood of deep sadness.
- The melody goes from top to bottom, the *music is quiet*, slow, the music stops all the time, it's not funny and freezes all the time.
- *Some elements* of the music piece *contradict to each other*. So, in the middle of the piece, a major suddenly appears, and then the same intonation resolves into a minor; and at the end of the piece, the statement of sadness is suddenly interrupted by sharp chord lines.
- The music conveys the *feeling of sadness* characterized by great complexity. There is not only sadness in it, but also bright moments that arise as an experience of their memories (what was lost was so good!), and hope that what was lost may be found, and annoyance at themselves (how did it happen!).
- The logic of constructing music is not an exact copy of life's emotions but seeks to evoke certain emotions and feelings in the listener. *This is the artistic function of art.*

Each variant was corresponded to the level of music perception (Fig. 1).

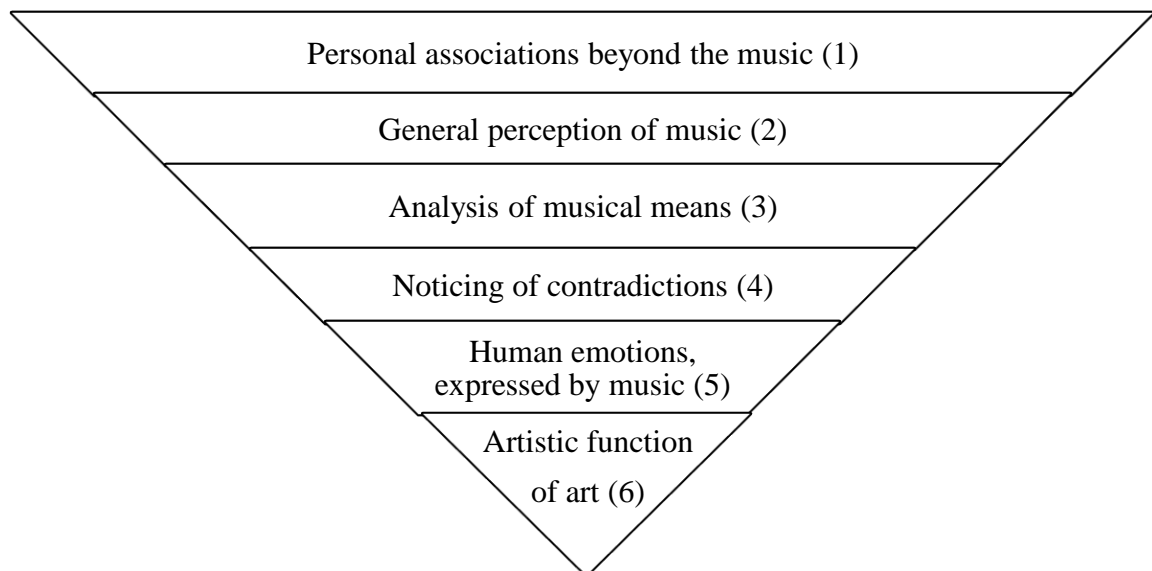


Fig.1 The levels of music perception by school children

All these variants were ranged by six-point Likert scale from the low to high perception of the core of music. For instance, the lowest rank was given if the description covered only the associations beyond the music, while the highest rank was given if a student was able to generalize the music piece perception and point its artistic function for the art.

The second survey contained of closed-ended questions of pointing the types of music activities in which a student is involved regularly. The score was depended on the number of chosen points (max 8) among the list of activities, such as singing, performing musical instruments, improvising, or composing music etc. were chosen.

The list of types of music activities in which school children were involved:

1. Singing solo or in an ensemble
2. Playing musical instruments
3. Listening of music
4. Improvising of composing of music

5. Learning music literacy
6. Learning music history
7. Interpretation of music pieces
8. Other

The quantitative results were proved by the statistical methods of median and standard deviation, as well as the Pearson's r method was implemented by the structural equation modeling (SEM), which was executed by the software "Ωnyx".

For the studying of the second objective the method of one-on-one interview was chosen. This is the common type of qualitative research method. It uses the open-ended questions from researcher to participants related to a particular subject. It appropriate for using in a case when a researcher needs to collect in-depth qualitative data according to the research goal. This method based on pre-determined questions to gather specific information about the research topic. Our interview was conducted via face-to-face.

Nine university teachers were asking questions about the future of music education due to the spreading digitalization. Summarizing, by the interview, the answers to the questions were received and analyzed:

1. Do you think digital tools will absolutely replace wood instruments in school?
2. In your opinion will digitalization effect to the availability of music education? Will it increase or decrease?
3. Could you point any advantages of using digital tools for music education or making-music?
4. How will the digitalization of music change the balance of Ecology of Human Musical Activity?

All the responses were carefully recorded and analyzed.

*Results.* The results of both surveys were counted by the methods of median and standard deviation. The median of the first survey reached 4, 6, and 5 points in each of three schools respectively. The standard deviation between all the responses in the first survey was received as 1.1232, 1.4533, and 0.9857, that are laying between 0.9 to 1.4, and demonstrate very low level of difference among all the results. The median of the second survey reached 5, 6, and 6 points in each school. The standard deviation in second survey results was fixed as 3.5452, 2.8967, and 3.1343, that are laying between 2.8 and 3.5, and show the not high level of difference among the received results. The results of first survey allowed us to state the high enough level of school children's musical intelligence, while the high level in the second case confirmed the school children's musical activity. By using the method of Pearson's r for the obtained data of two survey were received 0.87, 0.79, and 0.81 points respectively. All of them were interpreted as high level of statistical confirmation.

Table 1. Results of 1<sup>st</sup> and 2<sup>nd</sup> surveys

Schools	N (total)	Gender	Age	Q1 (max 6)		Q2 (max 8)		Pearson r	p=0.05	p=0.01	
				M	SD	M	SD				
School 9	76	M	7	10-11	4	1.1232	5	3.5452	0.87	0.22	0.28
		F	16								
School 13		M	11	10-12	6	1.4533	6	2.8967	0.79	0.24	0.29
		F	18								
School 35		M	13	10-12	5	0.9857	6	3.1343	0.81	0.31	0.33
		F	11								

The obtained results were used for creating structural equation model by the software “Ωnyx” (Fig. 1). While assessing the proposed model, each factor of SPME, showed a significant positive relationship with overall item, varying from 0.12 to 0.89. The assessing of awareness of the understanding the meaning of showed positive relationship with observed indicators, varying from 0.16 to 0.49. The involvement of children in music activity demonstrated variability from 0.15 to 0.89. Further, the assessing of structural relationship between music meaning awareness and involvement in music activity showed positive impact of the first one to the second. These findings indicated that the proposed model presents the influence of the schoolchildren ability to understand the meaning of the musical pieces to their intensiveness of self-performance musical practice. Based on the experimental work results it was concluded the intensity of school children`s engagement in music activities strongly depends on their ability to understand the meaning of music.

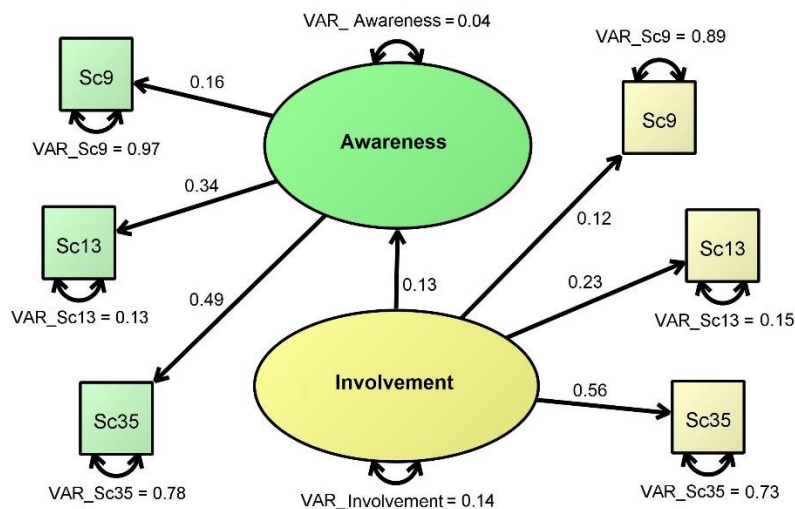


Fig.2 Analysis of school children`s engagement in music activity due to their ability to understand music

The qualitative results were obtained through the interview of nine university teachers about the future of music education due to the global digitalization.

For the first question teachers suggest in the nearest future computer labs and digital tools will penetrate deeply in the music education, and even more significantly in the music-making industry. At the same time traditional music instruments will feature mostly the area of academic music:

- *More and more music teachers today prefer to use digital equipment on the lesson rather than play piano by themselves or any other instrument. That is much more easily, does not require self-prepare practice, allow to demonstrate any kind of music.*

- *Electronical device allows producing wide range of sounds, to imitate any instrument, even very original and unique. That does not require specific skills or knowledge of different instruments, while a teacher can provide music of any genre and style.*

The second question showed the teachers are trying to predict the future in the field of music, and their forecast is not optimistic enough:

- *If digital instruments will be available everywhere very soon they absolutely replace all common music professions. That will be unnecessary to learn music from the very childhood and even improve regularly the specific skills. A person can press the button and become a music-maker.*

- *Classical music education will be very expensive and will be available for the very few numbers of people. It will be elite, while generally all our children will learn music by the computer.*

The next question allows stating some advantages of using digital tools on music lesson, and what is more, for making-music and people, who did not have such opportunity in their previous life:

- *Digital tools make the music more available. That is crucial for people, who did not receive music education in the childhood. Moreover, some of them, who does not have specific skills, for instance, unable to distinguish sounds clearly, however they can produce music without any frames by using computer lab.*

- *The making music for sometimes does not need in serious background, specific knowledge of music genres or styles. So, music for the film very rare to attract a viewer. Actually, not all the people even paying attention to that. Producing sounds for film industry will be much more productively if using only several buttons on the keyboard instead of efforts of the group people including composer, conductor, musicians. When each of them need a lot of years for studying music, daily routine practice of musical performing, expensive musical instruments the using computer will be not only cheaper, but respond enough to the real human attention.*

The last question of the interview let us point the problem of keeping the balance of ecology of human musical activity. Mostly university teachers confirmed the relevance of the issue and their forecast demonstrated hesitation:

- *Fostering the using of digital instruments threatens the balance of human culture globally. While the area of academic art will decrease and mass culture spread more than in the last decades and even centuries, we really can lose our best traditions, because young generation will not learn the language of classical music.*

Summarizing all the responses it is possible to state the digitalization in the music field is a leading trend today, which tend to replace traditional music instruments by computers. Doubtlessly this process will affect the system of music education, that in some directions will be not available broadly mass of people.

### *Discussion*

Discussing the perception by individuals of the meaning of music the definition of music as a language seems to be crucial. In this respect critically to state the function of music to translate messages, which is moreover allowing its indexing for retrieval purposes, used by engineers in producing apps for searching of music in the net. Looking from the opposite point of view the meaning of music varies according to the person who interprets it. So, the personal factor effects on how music is organized and retrieved.

In this context, the problem of the personalization in music becomes very close to the field of cultural ecology. This term was coined by Steward, who defined it as the ‘study of the way of adaptation of peoples` culture to their surrounding environment, that reflects the level of harmony between people and nature’ (Steward, 1955). The remarkable citation of Steve Jobs, a global leader of digital technologies is “Technology alone is not enough” (Lehrer, 2011). This phrase means the human nature is much more vibrant than any technology, and no one computer is able to replace a person. By the way, the objects from the real life always were the inspiration for Jobs in his developing of the best computer in the world. The wide using of digital tools tends to the impairment of the role of personality in music and entail the disbalance among a person and nature.

Ecological approach in music tends to sustain the personality during the work with digital tools. In such a way computer technologies become useful for the implementation of the artistic idea much quicker and easier, to correct mistakes and organize productive self-training

performance practice (Price, 2013). What is more it promotes the redirection culture away from economic prescriptions to value attitude to the surround environment (Bailey et al., 2019). That is why in time of global digitalization teaching of the music meaning through the individual perception becomes vitally important for the people` involvement in the musical self-productive practice developing in order to maintain the balance between all the elements of music education.

### *Conclusions*

Based on the research results were concluded, the meaning of music is the pivotal concept, which can be pointed as the main trend of structuring all the dimensions of musical activity. Fostering the children` ability to understand it in traditional as well as in digital music pieces is crucial for the balance of all the cultural environment` dimensions. Consequently, the professional learning of music needs to maintain the core of artistic studying such as personal music perception and ability to describe it in the terms of art in order to preserve all the unique elements of the human culture.

The digital tools in the nearest future will deeply penetrate all levels of human music activity such as amateur music-making, pop art, music fan, academic level. In some respect this process will bring advantages. Using digital instruments and computer lab will benefit the pop music-making for cheaper and easier. Moreover, they allow correcting mistakes in music and to learn how to play music instruments by watching YouTube or online course. Computer tools can make music available for people without social, age or educational limits. The advantages for academic level are the most questionable. From one point of view the digital tools allow playing a musical score what is highly complicated for demonstrating by one person on piano, or replacing musicians in any role. But at the same time, they tend to mislead the perception of music and what is more destroy the ecological system of music education.

Multidimensional approach in education tends to support the mind` openness of students for new experience and creativity. It promotes experiments with genres and styles, enhance the professional competencies beyond the borders. This approach let us define the human musical activity as a system, in which all the elements featured by specific functions and position. The balance inside the system is critically important all over the world. In the age of global implementation of digital tools some elements, particularly the area of academic music, are changing their forms. So, the professional learning becomes the critical bridge between traditions and innovations in order to preserve the cultural ecological balance in the multidimensional world.

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