

# Music in the Convergence Processes of Education

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## ABSTRACT

The article highlights the urgent problems of modern education, causing a number of contradictions that appear both at the level of society and at the level of personality; the sources of these contradictions are analyzed, which consist in the hyperbolization of the role of thinking in the processes of transmitting the experience of mankind and in the fragmentation of scientific knowledge, devoid of personal meaning for students. Music is considered as a means of convergence into the educational process, in its deepest foundations, since its use contributes to the interpenetration of scientific and artistic methods of cognition. The article summarizes the traditional forms of application of musical art in order to integrate disciplines of the artistic cycle and shows the possibilities of addressing to it in the framework of natural sciences; the article reveals the potential of music for comprehending the spiritual component of the culture of other nations, and for shaping the worldview of students and understanding the principles of the universe.

**Keywords:** *convergence; learning as a transfer of meanings; competency-based approach in education; conceptual and verbal way of transmitting information; convergence of methods of cognition*

## 1. INTRODUCTION

The rapid changes taking place in our lives make us rethink the place and role of man in the world (nationwide, planet, space), see the power of human intelligence and the fragility of the universe as a system, in the center of which is homo sapiens. With the development of mankind, the contradictions concerning not only society, but also the individual, personality become more and more obvious. Humanism as the banner of the New Age, singing the value of man and the dominance of the mind, unexpectedly contributed to the cultivation of not only individualism, but also egocentrism, egoism, spiritual primitivism. A modern person, even being an educated and highly qualified specialist, can show cruelty or indifference even to close people, use scientific achievements for selfish purposes, and consider his professional development as a way that provides only his own comfortable existence. It turns out that the modern educational process, actively introducing advanced communication technologies, does not yet guarantee the permanent movement of society in the direction of spiritual and moral improvement. One of the reasons for these problems is that the experience of mankind (namely, the purpose of education is to master the experience of mankind) is passed on to the younger generation as a system of meanings, rather than being broadcasted as a system of meanings.

Leaving aside the problem of differentiating sense and meaning [1, 2], we nevertheless note that the activity of thinking is quite sufficient for the understanding of sense (knowledge), while the understanding of meaning requires the inclusion of many human psychic systems [1, 3-5]. It is no coincidence that a number of researchers emphasize the role of the body in semantic processes [6-8]. In the modern educational process characteristic of Western civilization, the absolutization of thinking takes place, which is explained by a long tradition of using the conceptual-verbal way to transmit knowledge. Having significant advantages over other methods of transmitting information and ensuring the progress of human society, this method nevertheless carries with it some negative aspects. Among these, first of all, it should be noted the loss of human integrity and the limited nature of his relations with the world.

The fact is that the network of concepts that we cast on the surrounding reality in order to understand and evaluate it, splits the picture of the world, makes it "one-way", devoid of sensory polymodal. The priority of the conceptual and verbal form of information transfer impoverishes our perception of the world, and often replaces it with knowledge about the world. Many modern people the main layer of information receive through thinking but not through senses. Modern man often does not notice the colors and sounds of reality surrounding him, its beauty, harmony. From here, he cannot feel happy, satisfied from life. At the same time, man is a creature not only open to sensations, but also longing for these sensations, longing for fullness of perception. And

when an individual does not find this in his life, he begins to look for these sensations in esotericism, mystical practices, computer games, drugs, alcohol and other ways to overcome the framework of reality. The negative consequences of such searches of an individual in the Man – World system can be avoided if ways are found to compensate for the limited perception of the world.

Another negative point that naturally follows from the dominance of the conceptual-verbal way in obtaining education is the priority of knowledge. Knowledge for the sake of knowledge - such is the unspoken rule that has prevailed in Russian education for many decades and likens the individual to a computer's hard drive loaded with information. An attempt to overcome the intelligibility of learning (that means limited thinking), which contributes to the development of primarily the mental sphere of the personality, was a competency-based approach that sends students to future professional activities, and therefore also involves the regulatory level of the psyche during their training. However, this approach, which undoubtedly has a number of advantages, has its limitations in solving the global tasks of educating a person. The fact is that the main emphasis in it falls not on universal, but on professional values. And the person here appears as a cog in a coherent system of production of goods, products, services, etc., into which education itself also falls as a service.

The next problem in the modern educational process is the fragmentation of knowledge. In the course of the history of mankind, an ever deeper penetration into the secrets of matter, time and space, the laws of the universe and life naturally led to the differentiation of scientific knowledge, manifested in the birth of many new sciences, which, developing, deepen their vision of the studied object and, at the same time, narrow professional and scientific interests. Herewith scientists become narrow specialists, sometimes not understanding each other, which unwittingly resembles the biblical parable of the Tower of Babel. However, true knowledge and a scientific vision of the world is hardly possible based on only one science. Very many significant scientific discoveries arise due to the intersection, integration of sciences.

Since one of the tasks of education is to transfer the scientific knowledge accumulated by mankind to the younger generation, many patterns, as well as positive and negative aspects of the development of science, are reflected in the learning process. In particular, in schools and universities, there is often a multidisciplinary subject to a good desire to give the student as much information as possible about the laws of nature, about various types of human activity, about the laws of human consciousness. However, the result of such training is a disparate set of private knowledge that does not in any way form a complete picture of the universe in the mind of a young man, just as a certain set of puzzles does not add up to a common mosaic. And the students, speaking the ideas of folk wisdom, "do not see forests beyond the trees".

## 2. METHODOLOGY

The purpose of the article is to formulate the problems of modern education and propose one of the ways to solve them. This is the interpenetration of various components of human experience carried out with the active use of music. Of course, music itself is a very interesting object to comprehend. This is evidenced, for example, by the emergence of new theories in musicology, new methods of its analysis. And here we can name the Schenker method of reduction, which emerged at the beginning of the 20th century, or the Neo-Riemannian theory of harmony and the Accordion Geometry by Dmitry Timoshko. Many evaluate this as a revolutionary view of things well known to all musicians [9-11]. However, in this study we are interested in music as a tool in solving the problems of didactics, as a shaft (web) of convergence in the depths of education. The conceptual and methodological basis of the proposed approach is the understanding of art as an objectification of meanings, which is reflected in the intonation theory of Russian musicology.

To achieve this goal, we touch upon such issues as convergence in science, convergence in education, the specificity of music and musical perception, and the reflection of the principles of the universe in music. The search for answers to the questions posed, implemented through the formulation of a number of tasks related to various fields of knowledge, was carried out using multilevel methods. The most important of these was the dialectical method, which consists in examining music and its connections with various components of the educational process in their entirety and variety. Other methods that allow to see the solution to the problem through the eyes of the student were methods of modeling didactic situations and a thought experiment connect with the non-traditional use of music in classes of exact and natural disciplines. In general, they fit into the framework of the phenomenological approach. The methods of analysis and generalization of scientific and musical literature were also significant in the study.

## 3. RESULTS

As a result of the study, the potential of musical art to solve the indicated problems was revealed, and most importantly, it was revealed that the appeal to musical matter (with the correct organization of work) can withstand hyperbolization of thinking in the educational process and will positively influence on human cognitive processes. Music will be the factor that will contribute to the comprehension of scientific information as meaning (what is experienced), but not just as sense (what is thought).

When researching the problem, it was necessary to generalize already having pedagogical experience related to solving convergence problems. At the same time,

convergence processes in education are presented in a new light. In their obvious form, they manifest themselves in the integration of the disciplines of the artistic cycle; the "abyssal" component of convergence processes is the intersection of the methods of scientific and artistic knowledge. Such an intersection is realized in the multi-channel introduction of music in the educational process, and this will contribute to the restoration of human integrity.

The most important result of the study was the understanding of music as a multifunctional phenomenon of the educational process. Effective use of it in pedagogical practice requires the teacher to have deep knowledge:

- of the features of reflection in the musical matter of the external and internal world of a person, his states;
- of mechanisms of musical perception;
- of principles of the functioning of the brain and various levels of the human psyche;
- of didactic tasks.

#### **4. DISCUSSION**

Convergence is the interpenetration of various phenomena. In science, convergence is the interpenetration of various branches of knowledge on the basis of the existence of certain general principles in the "structure" of the phenomena studied. In vocational education, it arises in response to the fragmentation of scientific knowledge and acts as a method which overcoming specialist training with a limited and one-sided vision of the world. Convergence allows man to explore the separate studied phenomena under study from various and in different angles, or to see it through the prism of a certain universal law. So, the laws of the existence and behavior of elementary particles, nanoparticles allow us to study elementary particle physics, supramolecular chemistry, molecular biology, pharmaceuticals and a number of other disciplines from a single perspective. Very successfully, this approach to the organization of training began to work, thanks to advances in nanotechnology, ensuring the interpenetration of science and technology.

However, there are other reasons for convergence processes in education. And they are associated with the need to activate all types of cognitive activity of the students' psyche, and not just their thinking. And music in this context of solving the problem of improving the educational process has special potentials. The fact is that musical and sound matter, by virtue of its nature and characteristics of the human psyche, can cause a wide variety of sensations and perceptions. The perception of music allows a person to significantly expand the scope of his experience of feelings, in the literal sense, to feel previously unfamiliar states in his body. In addition, music, being a temporal kind of art, is able to direct a person's state. It is no accident that it is actively used to

influence the human consciousness for a variety of (not necessarily bad) purposes.

Note that the state in which a person is one of the most important factors in the development of mankind, the organization and structure of people's lives. To manage the conditions of the people, to cultivate the conditions valuable for the development of society is a very difficult task and requires awareness on the part of pedagogy. Art plays an important role in the solution, since, like science, it stores and transmits the experience of mankind from generation to generation. But if science has the experience of facts (sense), then art retains the experience of relationships (the experience of meanings). The experience of relations here should be understood as the experience of human states in connection with one or another "fact". The "facts" can be not only universal values, but any objects, phenomena, processes, events, the inner world of a person, etc. - that is, all that makes up our everyday life.

The special role of music in improving the educational process is also explained by the fact that, like no other art kind, it is able to actively and multidimensionally participate in convergence. Convergence in the conditions of a comprehensive school is well known as integrative learning, which is multifaceted and serves not only to gain some volumetric knowledge, but also determines other positive results of the pedagogical impact. The integrative learning contributes to the comprehensive development of children (the development of their thinking and creative abilities), relieves or at least reduces their fatigue due to the use of different sensory systems and appeal different hemispheres of the brain. It ensures the inclusion of more students in the training (since the problem of knowledge transfer, due to the characteristics of brain asymmetry, is removed) In pedagogy, the advantages of integration processes in teaching children have long been recognized. We find this in pedagogical activity, in the theoretical works of J. Comenius, D. Locke, I. Pestalozzi, and others [12, 13].

If we talk about music, then it plays an important role in the integration processes of the disciplines of the art cycle. Here it is necessary to indicate classes based on the thematic commonality, for example, classes in fine art and music. Such gracious material is the material of topics related to the seasons or time of day, with landscapes, much less often with portraits. In such lessons the music works of A. Vivaldi (Seasons, Night), J. Haydn (Seasons Morning, Noon, Evening), P. Tchaikovsky (Seasons), R. Schumann (Stranger), K. Saint-Saens (Carnival of animals) sounds.

On the basis of a thematic commonality music in the conditions of the educational process successfully combines with both poetry and literature. These three arts, of vote origin, have many intersection points, even if to do not count numerous operas, oratorios, cantatas, masses, etc. Some of these intersections both the musical and literary works are found because a common plot or are connected with the same hero, character . Here you can

recall "Francesca Da Rimini", "Romeo and Juliet" by P. Tchaikovsky, "Faust Symphony", "Preludes" by F. Liszt. Other intersections are due to the presence in the works of art of certain mentions to another art (which is typical of literature) or of specific musical works (L. Tolstoy's "Kreutzer Sonata") or situations of music performance (I. Turgenev "Singers").

In many lessons, music often serves as a background for the perception of a poetic, literary work (its fragment), and paintings. The most important task solved by the teacher is to select the music works and works of various arts so that they adequately correlate with each other. The fact is that any work of art takes its place in culture, and connected with other works thousands threads. When a person perceives a work of art, a certain system of associations arises. If the works of art are not selected correctly, mismatch between the associative funds of a person and the perceived material arise. Therefore, artistic material should be selected not by intuition (as is often the case in modern teaching practice), but on the basis of an understanding of the characteristics of historical styles, mechanisms of artistic perception, the laws of objectification of meaning in the material of various kind of art.

Such treatment of music avoids the feeling of imposing it. It will be consistent with the nature of art, which seeks to involve the whole person in acts of perception, to activate many sensory systems of the reader, listener, and spectator. By the way, we note that in the artistic field for this purpose (to activate many sensory systems), writers or poets often create multimodal images based on synesthesia (on connections between different sensory systems). Similar multimodal images can be easily read in such lines as "Her look is green-green, the voice of her is lilas" (F. Garcia Lorca), or "I just saw with my eyes this laugh: curve of this laugh which ringing, whip-like," (E Zamyatin).

If in literature and poetry various sensations arise indirectly (when relying on the second signal system), then music, due to its specificity, can cause many non-auditory sensations in the listener (visual, tactile, gravitational, kinesthetic, proprioceptive, tactile, etc.) directly. This makes it a very effective tool for a multifaceted impact on a person and helps to restore the wholeness of a human being. This effect is due to the fact that music reflects a person in his integrity. It is emphasized by musicians especially [14, 15]. So, M. G. Aranovsky writes "... Art in general, and music, perhaps, moreover, reflects Man in his wholeness. In the integrity in which everything merges and which does not lend itself to an exhaustive analysis" [14].

It can be noted that the appeal to musical art in integrated learning may go beyond the interdisciplinary communications of the disciplines of the art cycle. Musical sounding can act as a important factor contributing to the assimilation of material that is mastered intellectually. We are talking about the inclusion of music in the lessons of the disciplines of the natural

science cycle, such as biology, chemistry, physics. So, for example, when studying a phenomenon such as water, teacher can use to musical sketches of water (they can be found, for example, in the music works of N. Rimsky-Korsakov, A. Lyadov), and when studying topics related to gas and air he can use musical embodiment of the movement of air masses (F. Rybitsky "Breeze", D. Ligeti "Atmospheres"). You can also recall the existence of such works that lead to areas very far from art. These are "Mutations" of L. Berio, "Metastases" of J. Xenakis, "Ionization" of E. Varez, "Glow" of K. Penderetsky. The names of these works speak for themselves, and music is a musical and sound objectification of the corresponding phenomena and concepts reflected in the consciousness of the musician-creator.

The list of musical works that takes the listener far beyond the boundaries of topics traditional for music, but close to other areas of human knowledge (for example, the exact sciences) can be continued if we turn to the work of modern composers. And here we can name the musical works of E. Varez ("Integrals"), R. Kalson ("Parallels"), M. Subotnik ("Parallel lines"), M. Chavez ("Polygons") and others. Appeal to music in connection with the study of all the phenomena mentioned above should be carefully thought out both in terms of the amount of time and the form of its inclusion in the lesson, up to such nuances of use as the sound volume.

As a means for deeper mastering of educational information, music can be used in the lessons of history, geography, and a foreign language. The problem of selecting musical works here appears in a different light. The selected musical material should correlate with the studied region, country, historical time, specific event, etc. In this case, understanding the educational material of the school subject, students will be able to comprehend the spirit of time, nation, mentality of people of a particular era and specific locality, that is, all that that should reflect and transmit high art.

The immersion of students through music into the culture and worldview of one or another people (it is realized as a complex of specific sensations, feelings) seems to be very useful when studying a foreign language. It is precisely these sensations that many polyglots speak of, explaining their ability to languages. In addition, appeal to music (or rather, music with poetic text) can greatly contribute to the mastery of speech skills. And this is due to the fact that verbal speech and music have much in common. They are related by a common vocal nature and temporal. It is not by chance that similar patterns are found in both verbal speech and music (this is structuring of a sound stream, derivational processes). And tracking musical sound involves connecting a verbal-speech experience. This usually happens because musical co-intonation activates the articulation apparatus. Such a close connection of verbal speech and music leads to the fact that many features of national speech are reflected in national music (in ethnic style).

That is why the inclusion of music (material of songs) of another peoples in the lessons gives good results. With the help of vocal music, children actively develop skills in the pronunciation of foreign words. This is because, while performing a song in a foreign language, students sing (for a more long time many pronounce these or other phonemes), and fixing on it their attention; their articulation apparatus, in this way, remembers the necessary movements. That is, they manage to do what they did not have time to do, when pronouncing words without music (during speaking). In addition, this method helps to master the syntax of foreign speech, its melodic features.

Finally, one must not be silent about the ability of music to influence the thinking processes of man. The fact is that many musical works model these processes. In some musical opuses, modeling of arbitrary thinking, or rather, phases of the thought process (problem statement, discussion of the problem and conclusion) and thought operations (analysis, synthesis, generalization and concretization, comparison) comes to the forefront. Other music works reflect the processes of involuntary thinking (associative or perseverative tendencies). It is clear that sounding music affects a person: it makes the heart and internal organs work in a certain mode. Undoubtedly, music affects the activity of the brain, forcing it to work in a certain mode [16-19]. This is a proven scientific fact, supported by a host of experimental data. Therefore, there is reason to turn to music and in the lessons of the exact sciences (for example, before or even during solving problems). But here one should competently approach the issue of selecting musical works, establishing the desired level of dynamics, determining the playing time of musical material. An individual approach is also very important, it makes possible to identify the advisability of turning to music considering the mental activity of a particular child. Speaking about the possibilities of music to influence the processes of thinking, one should also mention the very positive role of the music lessons themselves in the development of the human brain [19-21].

Convergence processes in education when using music can be implemented in one more - in worldview aspect. The fact is that music is an instructive example of demonstrating the unified laws of the Universe, which manifest themselves as numerical, gravitational, spatio-temporal principles of the structure of the Universe. In the Middle Ages, this was interpreted by the Fathers of Church as a manifestation of the Divine Logos in the small logoses of being. Here we can talk about a special sequence of natural numbers - the Fibonacci sequence - which is found in a variety of phenomena of both inanimate and living nature (this is the structure of the cochlea, leaves, fruits of plants, and galaxies "twisted" into a spiral). This special sequence manifested in various elements and aspects of music - in the diatonic scale, in the structure of chords, at the point of the "golden section" inherent in temporary arts [22]. The manifestation of the

"laws" of gravity in music can be seen in the existence of strong and non-strong tones, in music measure [23-26]. The principles of Universe (it appear as a connection between space and time) are revealed in music due to the ability of this art - temporary in nature - to build space (mental in nature). Not coincidentally, the words above and below are most common in the vocabulary of musicians.

## 5. CONCLUSION

Thus, music can serve as an effective tool for convergence processes in learning. Owing to its specificity, it is organically included in the processes of mastering by students of various topics, not only subjects of the art cycle, but also related to the field of natural-scientific knowledge. The using of music broadens the perspectives of considering the studied phenomenon, object, and contributes to the formation of a more holistic view of the universe and a deeper understanding of the structure of the world for the younger generation. It is able to optimize the processes of processing the information received, enhancing the emotional component or promoting a balance between the thinking and sensory processes of the psyche. Based on the processes of intonation (inner singing along), it has a powerful potential for solving problems of linguistic education. Music as art which being able to convey the spiritual component of human culture, strengthens the humanitarian component of education. All this ultimately serves to solve the problem of the humanization of the educational process.

The stated approach to music shows that this art serves as a convergence of academic disciplines not only on the basis of convergence of the content of educational material, but also on the basis of combining scientific and artistic ways of mastering the world. This clearly poses special challenges for musical-pedagogical education. It is clear that the correct use of music involves the mastery of a musician teacher of such knowledge and skills that go far beyond the sphere of narrowly specialized competencies.

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