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THE SUBSTANTIATION OF RESONANT PEDAGOGY

Annotation. *The article provides a justification for resonant pedagogy, which is emerging at the time, since the educational process will be a fundamentally resonant phenomenon, which is implemented at the level of verbal, extraverbal communication, and interaction in the field of neurons of the brain of participants in the educational process. The phenomenon of mirror neurons is analyzed, which can be understood as key in the field of psychological and pedagogical theory and practice. The justification of resonant pedagogy is carried out in the context of the pedagogical activity of the teacher, the main aspects of which can be transmitted to participants in the educational process in the process of mirror resonance at the level of the neural organization of the teacher's brain. Under such conditions, the professional competencies of the teacher should take into account the teacher's ability and experience to interact with students at the level of the phenomenon of mirror neurons, the introduction of which into scientific circulation can be considered as important and fundamental as the discovery of DNA in biological science.*

Key words: *the phenomenon of pedagogical resonance, ideomotor reactions, resonant learning, formative causality, pedagogical synergetics.*

Анотація. *У статті проводиться обґрунтування резонансної педагогіки,*

що постає на часі, оскільки освітній процес виявляється принципово резонансним явищем, що реалізується на рівні вербальної, екстравербальної комунікації, так і взаємодії на у сфері нейронів головного мозку учасників освітнього процесу. Аналізується феномен дзеркальних нейронів, що може розумітися як ключовий у галузі психолого-педагогічної теорії і практики. Обґрунтування резонансної педагогіки проводиться у контексті педагогічної діяльності педагога, основні аспекти якої можуть бути трансльована учасникам освітнього процесу у процесі дзеркального резонансу на рівні нейронної організації головного мозку педагога. За таких умов професійні компетентності педагога мають враховувати вміння та досвід вчителя взаємодіяти у учнівською молоддю на рівні феномену дзеркальних нейронів, введення якого у науковий обіг може вважатися таким же важливим й фундаментальним, як і відкриття ДНК у біологічній науці.

Ключові слова: феномен педагогічного резонансу, ідеомоторні реакції, резонансне навчання, формувальна причинність, педагогічна синергетика.

Introduction. Modern pedagogical theory and practice is in search of new effective methods, technologies, ways of implementing the educational process. The spiritual, economic, scientific and technical development of Ukrainian leads to an increase in the requirements for the qualitative potential of the professional competence of a modern specialist in the context of his/her ability to generate and implement the latest technological ideas. Therefore, at the stage of updating the national education system, the professional training of a teacher, a specialist as a carrier of socio-cultural development requires his/her involvement in active creative cognitive activity, stimulation to use one's own social pedagogical experience, familiarization with the modern innovative methods, technologies, and the ways of their implementing into the educational process. One of these methods concerns the phenomenon of *educational resonance*, since the educational process appears fundamentally resonant

Therefore, the **purpose** of the article is to substantiate the resonant pedagogy as

one of the effective pedagogical method and technology directed at updating the national education system and the professional training of a teacher.

The methods of the research covers theoretical analysis of interdisciplinary research field in the context of such scientific constructs and phenomena as synergetics, pedagogical synergetics, noosphere, planetary intelligence, mirror neurons, pedagogical resonance, resonant learning, meditation, suggestion, hypnosis, telepathy, intuition, superlearning, Gestalt education, suggestopedia, pedagogical synergetics, acmeology, methods of collective knowledge acquisition, ideomotor reactions, morphic resonance and formative causality, human brain, planetary intelligence, emotional intelligence, the quantum physics paradox the "Observer".

Research results.

The subject-object indivisibility of the participants in educational process reveals the phenomena of *resonant pedagogy*, resonant learning, which implement the processes of collective acquisition of knowledge, as well as the ability of young people to resonate with each other and with a holistic educational team.

Under the conditions of cardinal civilizational changes, pedagogical practice encounters new civilizational challenges that open the way to the establishment of a new scientific paradigm, the understanding of new civilizational and pedagogical realities, such as the noospheric movement, resonant phenomena of the world, theories of morphic resonance and formative causality, etc. [10], which reveal the phenomenon of «planetary intelligence», since today many scientists believe that information, which is the fundamental principle and a general property of the Universe, is connected with the process on planetary level. Here information is understood as the universal principle of nature and society. As V. Kaznacheev writes, thousands of years ago, primitive people (prothominids) who inhabited our planet, had 13–14 billion neurons accumulated in the brain – a kind of conductor-type computers that regulated the behavior of these creatures in the form of instinctive reactions. But the cosmic phase of the emergence of a new man and intelligence had come. In some parts of the planet, a strange process had taken place: in the head of the prothominids, these 14 billion neurons, in each of which there was already a

soliton-holographic form of living matter, explosively combine into one giant soliton. All generic formations turned out to be connected by soliton fields, which means that no matter how far a member of the primitive horde went, all its members saw him/her in holographic images. It is believed that not a single person, but a group united by one common field, formed the basis of the most primitive human planetary intelligence.

The mentioned phenomenon can be illustrated with an example from Lyall Watson's book «*Lifetide: A biology of the unconscious*», which describes a 30-year experiment with wild monkeys conducted by scientists on the Japanese island of Coshima. Scientists gave the monkeys sweet potatoes (yams) by scattering them in the sand. An eighteen-year-old female, Imo, was the first to wash the yams in water and taught other monkeys to do the same. After a few years, the number of monkeys washing the yams on the island of Coshima reached a critical mass, which Dr. Watson tentatively defined as 100 (the experiment was called: «the hundredth monkey»), and suddenly all the monkeys on the island began to wash the yams at the same time without any external prompting. In addition, absolutely all the monkeys on all the neighboring islands began to wash the yams at the same time. Scientists first observed something similar and suggested that there must be a certain field covering all the islands, thanks to which all the monkeys could «communicate» [12]. In general, a huge amount of experimental evidence has been accumulated confirming the existence of an information field, or planetary intelligence.

The mentioned phenomena find their embodiment in the educational field as the *resonant learning* [7], being reflected in modern pedagogical practice, which reveals ways to substantiate resonant mechanisms of the educational process. As a Ukrainian scientist M. Leshchenko writes, «when a group of people unites to perform a certain type of educational activity, the phenomenon of overlapping individual biological fields occurs and a total field of activity arises. If pedagogical activity is considered to be a process of energy and substance exchange between a teacher and students, then it is quite right to conclude about the existence of a communicative field having a cognitive-active nature» [2].

This conclusion is not unique, since currently in the field of pedagogical science such methods of educational actions as meditation, suggestion, hypnosis, telepathy [1], intuition, resonant learning, superlearning, Gestalt education, suggestopedia, pedagogical synergetics, acmeology, methods of collective knowledge acquisition, etc. are increasingly becoming relevant [7; 5; 13]. Hypnotic states can also significantly enhance intellectual and creative potential. For instance, the researches indicate that a novice chess player can drastically improve his/her skills through trance techniques, which are also applicable to other areas of human activity [4; 11; 13; 14].

Suggestopedic and other unconventional/innovative methods, aimed at activating altered states of consciousness, can result in extraordinary abilities [5]. Examples include individuals gaining near-instantaneous calculation abilities (e.g., a farmer struck by lightning developed complex mathematical skills) or becoming polyglots [3]. One notable case is that of W. Melnikov, a contemporary polyglot (knowing about 100 languages) who acquired the wonderful faculty after being seriously injured in Afghan war. Another case depicts an American man, Michael Thomas Boatwright, who inexplicably began speaking Swedish after regaining consciousness. After the incident where sixty-year old Boatwright lost his consciousness, he could only communicate in Swedish with doctors through an interpreter and failed to recognize himself in a mirror. Although he had visited Sweden several times, he was a U.S. citizen who had spent a decade teaching English in Japan.

Resonance learning is connected with the phenomenon of «*mirror neurons*» [8; 9] consisting in the process when the scheme of the neural ensembles of human brain in a person are reflected at the level of the neural ensembles of another person, provided that these people are in the process of communicative interaction. The discovery of mirror neurons is as important to psychology as the discovery of DNA is to biology.

In the early 2000s, Vilayanur Ramachandran, an Indian-American neurologist and neurophysiologist, and his colleagues verified the experiments on the

phenomenon of mirror neurons [9] using more advanced methods and obtained similar results.

It is important to note that the mirror neurons effect is connected with the ideomotor reactions [8] being subtle, involuntary bodily movements that reflect and implement person's subconscious thoughts and emotions. Ideomotor reactions in humans can be triggered not only by thoughts about one's own physical movements, but also by observing the physical movements of other people. This leads to a colossal civilizational phenomenon – «bread and spectacle», or «bread and games».

The evolutionary significance of understanding the phenomenon of mirror neurons as a process of neural and ideomotor imitation of interacting persons reveals several aspects related to learning, imitation, synchronization, and understanding the intentions of others. Such imitation, for which mirror neurons are responsible, is the basis of learning and development in many species, including *Homo sapiens*. From birth, a child learns to imitate the gestures and facial expressions of its parents and other people, without even understanding their meaning. As it grows older, imitation becomes increasingly complex as the child/person acquires complex skills.

When we observe the motor activity of other persons our mirror neurons, located in the motor cortex, are activated. When it comes to complex goal-directed movements and activity as a whole, mirror neurons are activated, being located in the frontal associative cortex (responsible for forming a global task and choosing an action program), in the premotor cortex (responsible for differentiating the program for individual movements), and then in the motor cortex (responsible for signals going to the muscles to perform movements).

One of the most striking examples of motor imitation is yawning: when a person next to you yawns, so you often feel like yawning in return; moreover, the desire to yawn also arises when we watch a movie or a photo with a yawning person, or sometimes even an animal.

As a rule, mirror neurons function during the interaction of animals of the same species, but there are examples of interspecific imitation, when dogs are often able to repeat some of the movements of humans.

Synchronization of behavior and psycho-emotional states is the most important aspect for the successful functioning of social communities. For effective interaction, the state and actions of each member of the group must be similar and coordinated. This creates the basis for successful food search, hunting, defense and attack, and movement in space. A sensory (sound, visual) signal from one individual is transmitted to another and causes the appearance of a similar signal in it due to the work of mirror neurons.

There is evidence that mirror neurons function more actively in close communities than among strangers revealing the social phenomenon of «team spirit». The effect of greater activation of mirror neurons in someone we consider to belong to our group is especially strong in the process of emotional reactions, in particular empathy. In this case, mirror neurons located in the limbic system and some other brain structures begin to function actively [8].

Thus, the interaction of participants in the educational process occurs at the level of the neural organization of the human brain, when the neural ensembles of the brain are able to reflect human activity – physical and psychological, which is accompanied by the creation in the brain of a certain and unique neural picture associated with a certain and unique human activity. This peculiar picture of neural ensembles can be translated into the brain of another person in a situation of close communication. That is, when a learner observes the actions/activity of a teacher in the mode of active interaction, a picture of neural ensembles is formed in the brain of the learner, identical to the same picture that is generated in the brain of the teacher.

So, the learner turns into a teacher in the sphere of nervous processes at the level of the neural organization of the learner's brain, who, although remaining a passive observer of the teacher's actions/activity, nevertheless mirrors these actions at the internal virtual ideomotor level of learner's organism. Thus, the real process turns into a virtual one through the process of neural transfer of information from the teacher's brain to learner's brain.

Resonance learning is closely related to the synergistic principle of ultra-weak signals and the concept of a universal semantic space of the Universe (as well as to

the synergistic principle of integrity), which stems from the philosophical principle of the unity of the world, as well as from the so-called anthropic principle [6]. One of the epistemological consequences of these principles is expressed in the idea to which many philosophers were committed, namely, in the idea of the identity of the being and consciousness, according to which the laws of the objective world and the laws of human thinking are isomorphic. That is, there is a coincidence of the laws and forms of cognizing thinking with the laws and forms of objective reality, when, as Hegel wrote, things and thinking about them coincide, and the being appears identical to consciousness. In addition, the anthropic principle (or the principle of cosmological complementarity) establishes the expediency of human existence in the Universe; it proceeds from the understanding of man as an organic and active part of the Universe: refer to the paradox/phenomenon of the quantum physics the «*Observer*».

Conclusions. The peculiarity of mirror neurons is that they respond particularly strongly not just to the actions of other people, but to purposeful actions that reveal certain intentions of people. Since, thanks to the work of mirror neurons, the associative frontal cortex, premotor and motor areas are activated when observing a certain action, it turns out that both the action itself and the goal for which this action is performed are reflected in the observer's brain. Thus, we can understand/predict the intentions of other people, what they really want to do. This is the most important ability that helps in communication, in the educational process: we do not just imitate behavior, we model aspects of the consciousness of other people and can see the world from their point of view, predicting their behavior and understanding their intentions. This ability (called «*Theory of Mind*») begins to develop at the age of three and is the basis of *emotional intelligence*. The more developed the network of mirror neurons in the brain is, the better a person can understand others, «read» their states and intentions, and be more effective in communicating with people, in the process of organizing and managing the educational process. Under such conditions, this process of management and control must be resonant (adaptive), taking into account the psychomental states of the participants in educational process.

Thus, any action of the teacher can be transmitted to the participants in the educational process in the mode of mirror resonance at the level of the neural organization of their brain. This means that in the context of the phenomenon of mirror neurons, the teacher reveals a new and rather important aspect in the set of his/her professional competencies. Under such conditions, it is possible and necessary to develop a system of professional training of the teacher regarding his/her ability (in the context of knowledge, skills, experience) to generate appropriate psychomental states during communication in the educational process, as well as the ability to transmit these states to pupils/students. Under such conditions, the principle of personality-oriented education is implemented, which becomes fundamental in the context of the organization of the educational process since.

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