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PARADOX-ORIENTED EDUCATIONAL PARADIGM

Олександр Вознюк. Парадоксо-орієнтована освітня парадигма

Обґрунтовується парадоксо-орієнтована освітня парадигма. Показується, що актуальною є нова постнекласична освітня парадигма, яка має бути інтегративною, холістичною і передбачати інтеграцію теоретичних засад і практичних результатів наукових та педагогічних парадигм і напрямів. Аналіз загального змісту науки та філософії як форм суспільної свідомості, який ми провели у рамках побудови теорії синтезу знань, дозволяє дійти висновку, що становлення та розвиток нової постнекласичної наукової парадигми позначається на докорінному зрушенні суспільної рефлексії і суспільної свідомості від субстратно-речовинної, суб'єкт-об'єктної до субстанціонально-польової, резонансної суб'єкт-суб'єктної парадигми пізнання, від дискретно-атомарно-фрагментарного до цілісно-континуального, діалектично-парадоксального нелінійного світосприйняття, світобачення, світорозуміння. Зазначене реалізується у процесі синтезу раціональної та ірраціональної стратегій пізнання світу, зближення гуманітарних та природничих дисциплін та способів пізнання дійсності. При цьому парадоксально-нелінійне мислення має розвиватися завдяки парадоксальному дискурсу, що є одним із найважливіших методичних прийомів сучасного педагогічного процесу. Звідси випливає важливий висновок про нагальну потребу у комплексному розробленні окремого напрямку педагогіки – парадоксології, що має справу з розвитком в учнів та студентів нелінійного парадоксального творчого мислення. При цьому назріла необхідність не тільки реанімувати парадокс при вивченні точних та гуманітарних дисциплін, а й ввести спеціальний предмет – парадоксоведення, подібно до містичного богослов'я, яке є навчальним предметом у релігійних навчальних закладах.

Ключові слова: парадокс; парадоксальне мислення; гуманітарне та природниче знання; педагогіка життєвих фактів; метаморфозна педагогіка, творче мислення.

Александр Вознюк. Парадоксо-ориентированная образовательная парадигма

Обосновывается парадоксо-ориентированная образовательная парадигма. Показывается, что актуальной является новая постнеклассическая образовательная парадигма, которая должна быть интегративной, холистической и предполагать интеграцию теоретических основ и практических результатов научных и педагогических парадигм и направлений. Анализ общего содержания науки и философии как форм общественного сознания, который мы провели в рамках построения теории синтеза знаний, позволяет сделать вывод, что становление и развитие новой постнеклассической научной парадигмы сказывается на коренном сдвиге общественной рефлексии и общественного сознания от субстратно-вещественной, субъект-объектной к субстанционально-полевой, резонансной субъект-субъектной парадигме познания, от дискретно-атомарно-фрагментарного к целостно-континуальному, диалектико-парадоксальному нелинейному мировосприятию, мировоззрению, миропониманию. Указанное реализуется в процессе синтеза рациональной и иррациональной стратегий познания мира, сближения гуманитарных и

естественнонаучных дисциплин и способов познания действительности. При этом парадоксально-нелинейное мышление должно развиваться благодаря парадоксальному дискурсу, являющимся одним из важнейших методических приемов современного педагогического процесса. Отсюда следует важный вывод о насущной необходимости в комплексной разработке отдельного направления педагогики – парадоксологии, которая имеет дело с развитием у учащихся и студентов нелинейного парадоксального творческого мышления. При этом назрела необходимость не только реанимировать парадокс при изучении точных и гуманитарных дисциплин, но и ввести специальный предмет – парадоксоведение, подобно мистическому богословию, являющимся учебным предметом в религиозных учебных заведениях.

Ключевые слова: парадокс; парадоксальное мышление; гуманитарное и естественное знание; педагогика жизненных фактов; метаморфная педагогика, творческое мышление.

Alexander Voznyuk. Paradox-oriented educational paradigm

Paradox-oriented educational paradigm is substantiated. It is shown that a new post-classical educational paradigm is urgent, which should be integrative, holistic and provide for the integration of theoretical foundations and practical results of scientific and pedagogical paradigms and trends. The analysis of the general content of science and philosophy as a form of social consciousness, which we conducted in the framework of the construction of the theory of knowledge synthesis, leads to the conclusion that the formation and development of a new post-nonclassical scientific paradigm affects the fundamental and radical shift in social reflection and public consciousness from substrate-material, subject-object to substantial-field, resonant subject-subjective paradigm of cognition, from discrete-atomic-fragmentary to holistically-continuous, dialectical-paradoxical non-linear thinking and mastering the world by our contemporary. This is realized in the process of synthesis of rational and irrational strategies of cognizing the world, as well as to convergence of the humanities and natural disciplines. Thus the paradoxical-nonlinear thinking must develop thanks to paradoxical discourse, which should be one of the most important methodical techniques of modern pedagogical process. Hence stems an important conclusion about the urgent need for comprehensive development of a separate line of pedagogy – paradox study which deals with the development of non-linear paradoxical creative thinking in the students. At the same time there is a need not only to reanimate the paradox in the study of exact and humanitarian disciplines, but also to introduce a special subject – paradoxology, similar to mystical theology, which is a subject in religious educational institutions.

Key words: paradox; paradoxical thinking; humanitarian and natural knowledge; pedagogy of life facts; metamorphic pedagogy, creative thinking.

Formulation of the problem. The intensification of information flows being one of the main factors of the globalized world's entry into the information society era, reflects the crisis of the classical scientific paradigm and causes spreading modern science's tendency to exponential growth and renewal of knowledge, constant expansion and deepening of the fields of scientific research.

At the beginning of the twentieth century, the total amount of knowledge produced by mankind was doubling every ten years. Nowadays, this process takes only a year, and even less time. The information boom is caused, first and foremost, by repeated reproduction and reiteration of already known information, rather than by an increase in the amount of new knowledge.

For the first time in the history of mankind, ideas and technologies are transformed in time faster than generations of people, when the phenomenon of "half-life of competence" is urgent due to the fact that in some fields the scientific and technological base is changing significantly in a few years. According to some estimates, an average annual growth rate of new knowledge is 4-6%.

This means that about 50% of professional knowledge must be acquired by a specialist after his/her graduation from the institutes of higher learning. The amount of time required to upgrade professional knowledge for higher education professionals is 28% of the total amount of time an employee has at his or her disposal during the entire working period.

Against the background of these tendencies there is a crisis of both the modern scientific paradigm and the educational systems, which, in the opinion of S.U. Goncharenko, is a component of the global civilization crisis and is largely conditioned by the narrow disciplinary attitudes of contemporary education, as well as by its alienation from its humanitarian and natural science components.

The consequence of this is person's fragmented vision of reality, accompanied by birth of post-industrial information society. It is important to note, that such a vision does not allow people to adequately respond to enhancing the energy and environmental crisis of mankind, to devaluation of moral norms and

spiritual values, as well as to kaleidoscopic changes in technology, to instability of political and economic situations. Today, under the avalanche of information, we suffer from an inability to grasp the complexity of problems, to understand the connections and interactions between things arising in various fields of our life.

Therefore, it is clear that a new educational paradigm is urgent, which must be integrative, holistic and provide for integration of theoretical foundations and practical results of scientific and pedagogical paradigms and trends. In addition, the new educational paradigm must overcome the problems mentioned above and equip the young person with creative and dialectical thinking and cognizing the world that is changing drastically before our very eyes.

Analysis of recent research and publications. Various aspects of the formation of modern educational paradigm and paradigmatic approach in education are considered in the works of Ukrainian scientists (V. P. Andrushchenko, S. U. Goncharenko, I. A. Zyazun, V. V. Kizima, S. F. Klepko, K. V. Korsak, V. V. Rybalko, A. V. Voznyuk and others), in the studies of the scientists of foreign countries (Sh. O. Amonashvili, N. V. Maslova, G. K. Selevko, G. P. Shchedrovitsky, Thomas Kuhn, Stanislaw Grof, Imre Lakatos, K. Popper and others).

The purpose of the article is to substantiate the latest pedagogical direction and at the same time educational discipline – *paradoxology*, which should become one of the cornerstones of a new educational paradigm.

Main results. The analysis of general content of science and philosophy as forms of social consciousness, which we conducted in the framework of the construction of the theory of knowledge synthesis [5-7], leads to the conclusion that the formation and development of a new post-nonclassical scientific paradigm affects the fundamental shift of social reflection and public consciousness from substrate-material, subject-object to substantial-field, resonant subject-subjective paradigm of cognition, from discrete-atomic-fragmentary to holistically-continuous, dialectical-paradoxical non-linear thinking and mastering the world by our contemporary.

This is revealed in the process of synthesis of the rational and irrational strategies of cognizing the world, the unification of the humanities and natural disciplines and the mechanisms of cognizing the reality by a man, which is realized and substantiated in the plane of following tendencies and phenomena:

1) The information boom reveals a compensatory tendency for mastering the phenomenon of *the Whole* by science in general and pedagogy specifically, which manifests itself in the development of complex interdisciplinary studies combining the resources of the humanities and natural sciences.

2) The entry of mankind into the synthetic era of the information society stimulates a certain integration of the forms of social consciousness (science, religion, philosophy, art) revealing a return of human consciousness to ancient ways of cognition, when science and philosophy formed a single entity – natural philosophy.

3) Due to the tendency of actualization of such synergetic directions of pedagogical theory and practice, such as integration, fundamentalization and holism, the process of creating integrated courses combining the results and resources of the humanities and natural sciences is unfolding. In this regard, there is a departure of modern educational technologies from profiling (which implements the cognitive paradigm of the exact sciences) and the ever-increasing development of the paradigm of fundamentalization in education.

4) New criteria for obtaining scientific knowledge (which focus on such humanitarian aspects as intuition, imagery, metaphorical, mythological thinking, beauty, reflexivity, subjective experience, etc.) are formed arising from the paradoxes of modern knowledge in its methodological grounds: Kurt Gödel theorem on incompleteness (this theorem states that for any self-consistent recursive axiomatic system there are true propositions about the naturals that cannot be proved from the axioms), the paradox of development (the teleological paradox), the mathematical paradoxes of set theory, different ontological and semantic paradoxes, the paradoxes of quantum physics.

5) The scientific picture of the world is enriched by humanitarian aspects, which is realized in the synthesis of moral and factual, as well as in the anthropic principle, the noospheric organization of terrestrial civilization.

6) The integration of humanitarian and natural aspects of cognition and mastering the reality derives from the phenomenon of the integrity of human personality, being neither humanitarian nor natural in its pure form, since the personality develops and is formed in the integral field of socio-natural reality, in which there is a confluence of ambiguous and unambiguous meanings of human being, which involves the integration of the two types of knowledge.

7) At the psychophysiological level, we also observe the integration of the mentioned types of knowledge, which manifests itself in the concept of functional asymmetry human brain, which (concept)

turns out to be heuristic explanatory model cognizing a human being. In this regard, humanitarian, fuzzy knowledge can be considered as correlated with right hemisphere cognitive strategy, whereas unambiguous and strict knowledge acquired in the field of exact sciences is realized mainly at the level of left-hemispheric mechanisms that organize abstract-logical thinking. Due to this phenomenon we have the classification of people into artists and thinkers. It is clear that there are no "pure" artists and thinkers. And if there are pure types of people, they are realized as accentuated or pathological, which is manifested in two polar mental illnesses – cyclothymia and schizophrenia. In this case, schizophrenic as a purely left-hemispherical type is characterized by a lack of right-hemispheric aspects of mental activity – emotionality, ambiguity, metaphoricity. This circumstance is used in some tests to identify schizoid traits: a schizophrenic person, which reflects and masters the world in a unequivocal, monosemantic way, cannot perceive ambiguously-metaphorical linguistic constructions (i.e. proverbs and sayings) because this person is unable to extract polysemantic meaning from these linguistic constructions.

8) The mechanisms of creativity also involve a combination of unambiguous and ambiguous types of knowledge (correlating with the humanities and exact sciences), polysemantic-continual and monosemantic-discrete logic, which allows to implement the mechanisms of creative thinking being dialectical and paradoxical thinking, since strategies of cognition of the world, revealing diplastia (characteristic only of the human ability of combining in one context the incompatible and often polar opposite entities), which causes the understanding of the truth as “the unity of the opposites” (S.B.Tsereteli).

9) Natural sciences and the humanities approaches and tools of cognition, comprehension and mastering the world appear relatively opposite in their cognitive and psychological nature, but this contrast is counterbalanced by the fundamental unity and totality of the world.

In general, the new post-non-classical scientific paradigm states that everything is constructed according to a single plan, where the great is connected with the small according to the algorithm of similarities, which allows to speak about the actualization of the holographic principle (when the rough form implicitly contains information about the fine structure) or about the fractal algorithm (which allowed George Cuvier to reproduce the image of a fossil lizard in one phalanx of the finger). This conclusion is consistent with the data of transpersonal psychology of S. Grof (who studies the phenomena of altered states of consciousness) and corresponds to the concept of the holographic model of the Universe by D. Bohm, the R.Sheldrake's morphic resonance theory (developing the idea of mysterious telepathy-type interconnections between organisms and of collective memories within species), the torsion model of Akimov-Shipov, the theory of reciprocal subspaces by W. Tiller, etc [1; 2; 5-8].

The emergence of a new scientific paradigm is realized in the field of dialectics of three types of thinking and comprehension by a being human: sensual (i.e. right-hemispheric), rational (i.e. left-hemispheric) and meditative/creative. Essentially, as evidenced by encephalographic studies, the meditative state arises from functional synthesis, the harmony of the hemispheres, when their functions in the psychophysical sense are coordinated [3].

If we take into account that human development in ontology and phylogeny goes from the right to the left hemisphere, and from it to their functional synthesis, then such a holistic meditative way of thinking can be considered a higher level of cognition – a dialectical and paradoxical one, which realizes cognizing the world as a whole, which at the level of rational left-hemispheric traditional scientific knowledge is manifested as a paradoxical essence.

It is known that the development of science being a rational left-hemispheric entity is accompanied by the discovery of a variety of paradoxes, which are manifested, for example, in the process of teaching physics, which deals with the comprehension of specific physical phenomena that can be recorded experimentally, and therefore explained and cognized.

However, at a deeper and more detailed analysis of physical phenomena, we will sooner or later encounter phenomena that are not rational and difficult to bring to a satisfactory explanatory base. An example is the phenomenon of corpuscular-wave dualism, which reveals paradoxical properties of an elementary particle capable of combining two physical states that mutually exclude each other, since the particle simultaneously appears as a discrete entity (localized in space and time) and a wave (which has no time-space localization).

There are many paradoxes of modern science that show logical immunity, when purely logical means of cognition are not enough to comprehend the world. This requires the use of a metaphorically multifaceted, paradoxical strategy of cognition, especially since in the field of physical research there are facts when the principle of paradoxality is a valid basis for the expert evaluation of physical theories. An example is when a well-known physicist, N. Bohr, in the late 1950s, after a report by W. Heisenberg and W.Pauli, remarked, "We all agree that your theory is crazy. The question that divides us is whether it's crazy

enough to have a chance to be true".

Therefore, in addition to scientific thinking in the process of cognizing the world, education in the domain of its forms by means should involve paradoxical-dialectical, fairy-metaphorical worldview. In Soviet educational institutions, the paradox was ousted: there was a great danger that the paradox could lead to the mystical tenets of religion. Now that pedagogical science is on the path of changing its paradigm, it is time to introduce pedagogical procedures for the development in the students a non-linear dialectical thinking, which will significantly improve the efficiency of studying both the humanities and exact sciences, to renew the educational status of physics and higher mathematics being rich in many a paradox (i.e. the paradoxes of set theory, the paradoxical nature of transfinite numbers in the process of infinite growth etc.).

Therefore, the exact sciences and the humanities use the paradoxical nonlinear thinking inherent in the religious-mythological worldview, characteristic of both the consciousness of the representatives of ancient civilizations and of little children who perceive and master the world, mainly, at the level of the functions of the right hemisphere. The thinking of young children, like representatives of primitive communities, is alien to logical contradiction and causal one-sidedness; this is a paradoxical, multifaceted thinking, for which there is no strict distinction between part and whole, cause and effect, being and its name (see K.I. Chukovsky's book, *"From two to five"*, and also the works of C. Levi-Strauss, L. Levi-Bruhl).

Paradoxical thinking is embodied in non-classical (polysemantic, modal, etc.) logics, the foundations of which can be found in the depths of ancient wisdom – in the context of four alternatives to Indian logic, where in the sphere of relations of logical terms of affirmation and negation four logically equivalent alternative statements are found:

- 1) affirmation of something,
- 2) negation of something,
- 3) both affirmation and negation,
- 4) neither affirmation nor negation.

It is in a state of paradoxical thinking that the creative acts are realized, in which any person is open to uncertainty, paradox, revealing "twilight semi-existent essences" – the holistic mythological categories that allow generalization and, on the basis of flexible associativity, to reach the semantic unity of things, thus combining different conceptual rows of reality.

It is the paradoxical thinking and the ability to paradoxical behaviour that allow a person to grasp and introduce into his life the principle of metamorphosis of the world, which expresses the fundamental way of its actualization – motion and development. Any metamorphosis that embodies the process of transforming one into another is an educational resource that promotes the development of personality, since this development involves polysemantic and multifaceted processes of transformation of one into another. It can be stated that any phenomenon of social and psychophysiological reality (forms of social consciousness, phenomena of culture, social institutions, properties of the nervous system, etc.) is realized as metamorphic processes of the mutual transition of polar entities, which mutually exclude one another - the actual and potential, image and idea, excitation and inhibition, good and evil, internal and external, chaos and order, life and death ...

Therefore, if we summarize the educational process and express it in one concept, then this concept will be "metamorphosis", which as a conscious phenomenon can reach the level of creative metamorphosis. Therefore, the main task of educational metamorphosis is to teach a person to self-developing through self-transformation. For this purpose, it is necessary to form a special branch of pedagogy – metamorphous pedagogy, which would focus precisely on the formation of students' knowledge and skills concerning realization of different, including creative, metamorphoses.

In this perspective of the analysis of the problem of creating the metamorphous pedagogy, it is important to use, in addition to educational tasks of various types, also literary-verbal psychotherapeutic (cathartic) metamorphoses, the emotional and imaginative experience of which by all subjects of the educational process will ensure their personality development, lying not only in affirming the metamorphic worldview, but also in the ability to withstand destructive-manipulative metamorphoses.

It is important that metamorphoses, if they are illustrated by vital (scientific) facts, are able to radically change man's value system and worldview. Therefore, we can speak about a significant addition to *metamorphous pedagogy*, namely, *the pedagogy of life facts*, directed to accomplish man's multifaceted development through the dialectical system of metamorphic life facts. Moreover, the basic principle of persuasion is the principle of concrete presentation of the material, since the dry abstract facts are usually unconvincing.

Conclusions. Hence stems an important conclusion about the urgent need for comprehensive development of a separate line of pedagogy – paradox study which deals with the development of non-linear

paradoxical creative thinking in the students. At the same time there is a need not only to reanimate the paradox in the study of exact and humanitarian disciplines, but also to introduce a special subject – paradoxology, similar to mystical theology, which is a subject in religious educational institutions. All this is confirmed by three important world events.

1) *The UNESCO Memorandum* (1994) states that only basic education provides the universal knowledge, which acts as a factor of sustainable development of the countries and best prepares a person for life, since it implies the deepening of general theoretical, general pedagogical and general scientific training.

2) According to *Lisbon Strategy for the Development of Education*, adopted by the European Council (2000), scientific methods of cognition should be regarded as teaching methods, since educational, economic and social development strategies of society today are inseparable.

3) *The Jubilee Report to the Club of Rome* (2018) has a conclusion about the inevitability of a radical change in the paradigm of development of our civilization. The harsh criticism of capitalism, the rejection of financial speculation, the rejection of materialism and a simplified understanding of the world, the call for an alternative economy, a "new Enlightenment", a spiritual and moral worldview, a single planetary harmonious civilization – such is the agenda for future development proposed by the Club of Rome, which remains the main platform formulating an agenda of responsible globalism and sustainable development, and a guideline for a significant part of the world elite. The club sees the task of education in the formation in the youth the futures literacy. An education capable of doing this should:

- Be based on “connectedness” when different relationships must be the essence of learning; the use of information technology is valuable and effective only when they promote communication between people. So, education should arise interest, release energy and actively use the ability of each student to learn for himself and help others to learn.

- To express a value character and be rooted in universal values and respect for cultural differences since values are the quintessence of human wisdom, accumulated over the centuries; at present stage they are embodied in the well-being of all living creatures and the world as a whole.

- Be focused on sustainability since most of the knowledge regarding ecology, interconnectedness of systems and sustainable development has appeared recently and has not yet become part of the general cultural baggage.

- To cultivate integral thinking, and not be limited to analytical thinking, when learning system thinking is not enough, because in system thinking there remains a tendency to consider reality in rather mechanistic categories, unable to grasp its organic integrality. Integral thinking is able to perceive, organize, coordinate and reunite individual fragments and achieve a true understanding of the fundamental reality. It differs from system thinking, just as integration differs from aggregation.

- To proceed from content pluralism. The club states that many universities promote specific schools of thought, rather than giving young people the full range of conflicting and complementary perspectives. Contemporary students need inclusive education in which some forms of knowledge complement others, rather than exclude and reject them. Cultural diversity is also necessary for social evolution, both for genetic for biological evolution.

And here we come to the key point of the report – to the idea of a "new Enlightenment", a fundamental transformation of thinking, the result of which should be a holistic worldview – a humanistic one, but free from anthropocentrism, open to development, but appreciating sustainability and caring for the future. Along with the complementarity, the pillars of the "new Enlightenment", according to the Club of Rome, are synergy, that is the search for wisdom through the reconciliation of opposites, and balance.

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