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Experience of Integrating Humanities and Natural Sciences into the Educational Environment

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Abstract

Relevance of the paper is due to the need for understanding of educational environment, conducive to the formation of a creative, holistic and harmonious personality. The study used historical and cultural methods, method of comparative and system analysis. In this regard, complementary relationship between humanities and natural sciences, contributing to the development of symbolic thinking, was revealed. Peculiarities of symbolic thinking and its role in training the creative professional were shown. Approaches to investigating dialogue mode in the educational environment, resulting in the formation and harmonious development of the creative personality, were identified.

Keywords: Experience; education; creativity; personality; dialogue.

1. Introduction

One of the greatest physicists of the century Max von Laue at the beginning of the century formulated the essence of education as something that stays with you when you forget what you were taught. The outcome of education in this regard is one or more formal language skills, as well as personality traits, providing systematic creative

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thinking. Thus, the main purpose of education is to prepare for creativity, i.e. the ability of the individual to generate new, unconventional texts. The texts are considered as products of any cultural activity (scientific, social and artistic). The quality of education, in this context, can be defined as the formation degree of the main prerequisites of students' creative abilities: holistic worldview, self-reflection, inner freedom, emotional flexibility, etc. Its formation is impeded, in our opinion, by means of artificial differentiating between such areas of expertise as 'Humanities' and 'Natural sciences'. The purpose of the article is to identify the conditions, contributing to the formation of a creative personality in the educational environment.

2. Experience of educational environment in the medieval university

Differentiation of "Arts" and "Sciences" came down to us in the way it existed in ancient times. "Arts' was divided in two broad categories: mechanical or 'servile' (servile - slave, physical, mechanical type of labor) and free. As part of the mechanical arts, all operations associated with manual labor were united without distinction. Free arts were divided in two groups; its teaching regulated the entire academic curriculum in the medieval university: trivium and quadrivium. The first consisted of grammar, dialectic and rhetoric, the second – geometry, arithmetic, astronomy and music.

Differentiating between sciences in the Italian Renaissance period, more or less, coincided with the modern one. Renaissance Humanists developed the sphere of knowledge (studiahumanitatis), which included poetry, rhetoric, politics, and ethics, and excluded from the range of interests Natural sciences (i.e. philosophical ontology, physics, logic and medicine). However, as noted by Andreev, humanists, dealing with the certain cultural matter, were not considered humanities in the modern sense. Since the time humanities originated, has ended the period of the Renaissance culture. Renaissance division of sciences, almost identical to the modern one, differed from it in fact. Although, contemporary 'naturalists' twit humanities with inaccurate wording, fuzzy terms, intractable strict formalization and lack of universal verification mechanism, 'naturalists' were twitted about the same inaccuracies by the Renaissance humanists (cf. Serebryaniy, 1998).

Petrarch in his treatise 'On his own ignorance' noted that somebody knows a lot about animals, birds and fish and is well aware of how much hair is there in the lion's mane, and how many feathers are there in the hawk's tail, and with how many rings a squad can wrap the shipwrecked... (cf. Serebryaniy, 1998, p. 338). Information is largely false, but even if it was true, then it wouldn't contribute to a happy life. In fact, for what to know the properties of animals, birds, fish and snakes, if you do not know or do not wish to know the nature of man, why we were born, where we come from and where we are going? Thus, the 'study of man' is the supreme and worthy subject of Renaissance humanism. However, from the modern point of view, humanists studied nothing but Latin, and since the XV century – Greek as well as the works written in these languages. It was not a study, as it was not reduced to the sum of knowledge and information; with all labor costs it was regarded as a festive, coming out of the daily routine activity.

3. The classical and post-nonclassical model of education

Classical science gives a very negative image of a man, «machine animate», driven by pulses of instincts. This image lacks in a genuine recognition of the higher values, such as spiritual awakening, feeling of love, esthetic pleasure and pursuit of justice. Universe was shown as gigantic and fully deterministic clockwork, whose work was described by means of a specially developed mathematical apparatus – differential calculus. Difference – the meaning of this very mathematical operation plotted a direction vector for the classical paradigm, dividing the world and man into the object and the subject, and being philosophically justified by the writings of Rene Descartes (Cunning, 2010). Man-observer was opposed to the world and, in fact, was not included in the objective flow of processes. Modern times end with the process of destruction of the cosmos integrity, man is thrown out of the nature, is opposed to it, and the nature from 'temple' is converted into 'workshop'. It is these trends that originated the current differentiation, between the Natural sciences and Cultural sciences. Different nature of these areas explains their belonging to distinct cultures.

Newton-Cartesian model was adequate and even very successful as long as physicists investigated phenomena in the world of everyday experience, or 'in the zone of middle dimensions'. As soon as they start exploring microcosm

of sub-atomic processes and macrocosm of astrophysics beyond the common perception, classical model became unusable that led to transcendence. Not only in physics but also in other fields of knowledge, there were more and more phenomena, inexplicable within the classical paradigm. New evidence of physical, scientific, psychological, sociological studies helped design post-nonclassical paradigm, which further formation was supported by the development of cybernetics, information theory, systems theory.

Post-nonclassical paradigm includes classical worldview, recognizes the closed systems, acting as a mechanism, but as a part of the world of phenomena, forming complex open systems, characterized by an intense exchange (information, matter, energy) with the environment. Post-nonclassical science investigates not the terms of the world, split into regions of discrete elements and objectives, but semantic structures of different nature in the space of isomorphic transformations. A man is given a new role in this set of realities, that have different rates of self-transformation – a man is no longer a spectator or observer, but a full participant in the dialogue that has got, according to research by Korzhybski (2007), the unique ability 'to bind time', to transfer its experience to future generations by means of symbols, words and other 'values and records'.

The stages of this experiment are recorded at all levels of human development in terms of integrity, that is, in terms of organized fields of interdependent operations as a single space-time net of intertwined structures containing all the information about the world. Connectivity restoration of temporal experience is possible via comprehension of the 'problem of two cultures' as intercorrelated ones. Indeed, features of the humanities world, at first glance, are rather far from science in terms of problem content, content of questions and answers, and experiment content. But they are quite close in relation of the thinker to the experiment for courage with which the thinker goes in for the hardest paradoxical experiment, temperament of knowledge, pursuit of experimentum cruces, expulsion from the consciousness of all casual, routine, unrelated to the problem of space solution.

Within the post-nonclassical paradigm, the relationship between humanities and natural sciences can be compared to the relationship between electric and magnetic fields. The static electric field doesn't excite the magnetic one; the latter is proportional to the derivative of electric induction in time, i.e. its rate of change; in turn, the electric field is proportional to the rate of change of magnetic flux. Science as a system of positive ideas about the world has got little in common with poetry. On the contrary, the process of science, science in its development, science as a series of changes in the perception of the world, like the alternating electric or magnetic field, causes the field of different type; developing science causes a poetic component. The faster the science develops, the more experiment falls behind new generalizations or generalization behind experiment, or development of a new logical-mathematical apparatus behind generalization and experiment, the more prominent part is played by intuition, replacing syllogism for associations, symbolic generalizations, catalytically affecting emotions, mood in the development of other associative chains and symbolic images (Kuznetsov, 1965).

4. Development of symbolic thinking as a foundation for the creative personality formation

The imperative of symbolic thinking in the creativity formation is associated with its characteristics, genesis and special onto-epistemological status. "The truth did not come into the world naked, but it came in symbols and images" – reads the ancient apocryphal work (Sventsitskaya & Trofimova, 1989, p. 37-378).

The comprehension of truth often comes to us through the historical memory, spiritual insight and aesthetic experiences. Philosophical thought of Renaissance announced poetic image the repository of truth. In the speech, marking his crowning at the Capitol, Petrarch said that he could easily show how under the cover of inventions poets draw the conclusions on natural and moral philosophy, historical events, and it would prove that poet's, historian's and philosopher's matters, whether in moral or natural philosophy, differ the same as cloudy and clear skies, both shine similarly, but observers perceive it differently (cf. Serebryaniy, 1998, pp. 377-378).

A man needs not neither logic nor wisdom, noted de Saint-Exupery (1999), but a new picture, and pictures are created by artists, making stones and paints serve the free will of their work. Why do the symbol and the image become repository of the truth?

Conscious symbol is similar to the bridge that allows connecting two sides of reality – rational and intuitive. Symbol draws our mind to the deep roots of imaginative wisdom and connects with the experience of cultures. The symbol captures a certain type of relationship between cosmos and human microcosm, 'shows' a man the

consciousness environment. It can be assumed that any symbol requests understanding and contains some mechanism of self-realization, and requires it fulfillment.

Defining the symbol as a unity of form and meaning and pointing to its depth and compositional completeness, note that the symbol is utterly existential. The symbols deal not only with logic, but also involve emotional and sensual sphere through the plastic, color, image and composition. Mamardashvili (1997), analyzing symbols, defined their structure as cognitive completed harmonies, which contain the 'opportunity for breaking of our understanding'. Mamardashvili and Pyatigorskiy (1997) in their work "Symbol and consciousness" highlight the lack of symbolism in modern education. For various reasons, rooted in culture or mentality, symbols are often perceived as signs. That is, the symbols are 'signified', included in our mode of automatic sign operation, which naturally they do not belong to. Inside of our sign systems they are desymbolized, i.e. lose their direct 'conscious' content and become signs, strictly speaking, of anything. This transition from a situation of understanding to the situation of knowledge is associated with the semiotization experience where the consciousness symbols are translated into culture signs.

In contrast to the scientific knowledge of the world, the symbolic consciousness does not handle the system of categories and concepts, but completely and clearly grasps the fickle face of varied life, trying to capture every fact and the moment of being, while maintaining animated relationship between objects and phenomena, reflecting in it the organic integrity of existence. Studies of ancient cultures suggest that symbolic thinking is not only associated with primitive communities, but is generally inherent in the nature of human consciousness (Kukhta & Pelevin, 2015a,b).

5. Conclusion

Modern educational environment is oriented towards unification, which main goal is training a focused specialist that meets certain qualification requirements and standards. Focus of the educational process on openness does not involve information abuse or imposition of system of universal common knowledge, but creation of the environment, contributing to optimal and harmonious drawing creative potential out of the personality. A holistic worldview is formed in the synthesis of humanities and natural sciences. Thus, education, striving not only to the 'production' of focused specialists but, above all, creative personalities, shall be focused on eliminating the contradictions between the fundamental and humanities component. In this process, integrative in fact, the leading role is given to the development of symbolic thinking in the dialogue relationship between a student and a teacher.

The dialogue in the educational environment is seen primarily as a co-tune of two open systems, consciousness, devoid of dogmatic attitudes. Implementation of the dialogue mode is the first and important condition for the development of symbolic consciousness, awakening of creativity. Symbolic thinking does not deal with words, but images. The image removes all the contradictions, as only words oppose to each other, but a man, climbing step by step up, can see everything in a different way, and there is no contradiction for him (de Saint-Exupery, 1999). Imaginative symbolic thinking is characterized by a large flow of information into the mind at a time, incommensurate with verbal thinking. In the framework of symbolic image we can speak about a particular consciousness dialogue, dialogue of cultures, beyond the boundaries of time and language. Participants of the dialogue process do not 'educate' each other and mutually deploy their positions, and these positions require mutual listening to each other, but not mutual correction; only self-correction is acceptable in this dialogue.

Transparency is a must for the fruitful implementation of the dialogue mode in the educational environment. Ambitions, lack of thinking discipline and attention to listeners create information chaos. In conclusion, it should be noted that such an approach to education was implemented in the Pythagorean School which drew attention, first of all, to the development of moral and spiritual qualities, and then transferred knowledge according to the level of student's consciousness.

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