Methodological Potential of the Complexity Concept in Education Modernization

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Abstract: Changes in the existential situation of the humanity are increasingly testifying to their multidimensional, unpredictable and complex nature. Such complex entities as a society and a person not only demonstrate their multidimensionality and potential for development, but also need a different methodology for understanding them. The complexity concept allows to analyze existing problems looking at them in the context of probability and contingency. Complexity represents the reflection of the cognitive process itself, which is constantly transforming, generating unexpected meanings and opening up new facets of the modern world.

The article analyses the possibilities of the methodological potential of the complexity concept for the education modernization, which would take into account the variability and complexity of both the society and the human world. Education as a public institution is in the state of constant changing and reforming. The educational process is based on the understanding of knowledge as an open and incomplete one, which is in the process of development. Under such conditions, education is considered as an innovative environment that contributes to the formation of innovative characteristics and innovative thinking among all participants in the educational interaction. Its value for modern education lies in the fact that, firstly, it offers a model of a person's self-development in the rapidly changing and evolving world and secondly, it addresses the most important worldview problem – a person's search for his place in this world.

Keywords: *education; modernization; complexity; nonlinearity; contingency; openness; a person.*

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1. Introduction. Topicality

The realities of the modern world are increasingly providing evidence of the destruction of the stable structures that have hitherto defined the life of the society. A series of alarming forecasts and risks, an awareness of the world, which is on the brink, a sense of expectation of something new and unknown indicate that the world is changing and transforming dynamically. These changes are mostly uncontrolled by a person. They testify to its insecurity against the chaos of social processes and the self-organization of new local orders, which ultimately lead to the degradation of the habitual not only social, but also individual life.

The ordered models of the universe, which scientists worked on in the past decades, are not able to explain such processes and phenomena, which are so important for the person and the community, as irreversibility of existence, freedom of choice, dynamics and unpredictability of social processes, etc. Therefore, “for the replacement of such postulates of science as simplicity, stability, determinism the postulates of complexity, probability, instability are put forward; the researchers’ attention shifts from repetitive and regular phenomena to “deviations” of all kinds, to indirect and disordered phenomena, the study of which leads to extremely important conclusions” (Cheshkov, 1999, p. 137). Complexity is a key concept that defines the paradigm of modern scientific knowledge.

Modern realities predetermine the need to understand, imitate and learn the life principles in an unstable nonlinear world. The point is that a person must learn to live in the dynamic chaos, mastering its laws and peculiarities of practical realities. Ceausu (2018) believes that the defining skills and values of a modern person are tolerance, creativity, freedom, care and emotions. The scholar emphasizes that since the person creates different ideas, ways of thinking, values and knowledge, then the determining criterion for their significance is not the compliance with the criteria, but how useful they are for a person (Ceausu, 2018). So, the fundamental answer to the challenge of the era, which is capable of ensuring the further social progress, must be the formation of a person’s new way of thinking, new values, new feeling and perception, which correspond to the modern rapidly changing realities. According to Budanov (2003), today, more than ever, we need a holistic, interdisciplinary world view and it should be at the level of consciousness of the majority of citizens, otherwise the society will not have an understanding of global issues and how to solve them (Budanov, 2003, p. 50). The disorder and chaotic state are mostly considered not as the evidence

of destruction, but as the “creative potential” in the formation of a new order and harmony. In this regard, the question of what modern education should be in order to help a person find adequate answers to the challenges of modernity, fulfilling the preventive function of his preparation for life in modern realities is being actualized.

The sphere of education must perform not only the traditional function of transmitting social experience, but also in many respects the preventive function of preparing a person for life in times of crisis and instability. It aims to create opportunities for sustainable development of the society by preparing a person to solve global problems, to design innovations for further social progress. It is necessary to outline new directions of educational development in order to be able to counteract the chaos and to develop a strategy of behavior in it. Thus, it actualizes the search for productive methodological guidelines for its development.

In addition, the educational system, which is formed under the influence of the worldview and methodological principles of the classical scientific picture of the world, does not meet the requirements of our time. Being imbued with a rational, logical-conceptual, authoritarian style of thinking, it limits the cognitive initiative of a person and makes the educational process clearly regulated, conditioned and predictable. Learning is understood as a step-by-step process in which each next step in mastering knowledge is based on the previous one. In the context of this educational paradigm, the interest of those ones, who receive education, is considered as a manifestation of spontaneity, disorganization and involves the use of a system of prohibitions and punishments. Regulated and universally formal teaching methods are intended to “invest” in the heads of the educational process participants a certain amount of clearly defined and logically distributed knowledge according to the subjects. Such knowledge is “alienated” from the interests, preferences and wishes of participants in the educational interaction. Therefore, it causes poor quality of education and demonstrates a broken link between education and culture.

The educational environment appears to be a rigidly structured space in which the use of information sources tends to narrow down to an instruction, a guidance or a specific sample, while the methods that prevail in studying the material are learning by rote and drilling. The control of the acquired knowledge is usually repressive. The value of a person is determined by a certain amount of knowledge, skills and abilities in learning the world around us, but not by his existence. Under such circumstances, a person acts as a “consumer” rather than a “creator” of knowledge. In the changing and full of risks world, education must offer new and productive

ways of learning and personal. In the course of the development, he should take into account the complex, multidimensional and possible development nature of the world and a person. The point is that one cannot confine himself only to a rational method of cognition, since it will also include irrational, associative, intuitive and other forms of living rather than knowing the truth. Obviously, under the conditions of modern transformations education is turning into a rather complex social organism, which aims not only to demonstrate the ability to offer the necessary answers to the era challenges, but also to model social processes to some extent. In the modern realities, it gains a priority in the public life, as it has to fulfill its preventive and prognostic functions, revealing its complex and dynamic potential. These circumstances actualize the field of education to be regarded as a complex social phenomenon.

The purpose of the article is to explicate the methodological guidelines of the complexity concept in realizing the nature of education as a complex dynamic social system and to outline the ways of its further modernization.

2. Review of research on the topic

It should be noted that the phenomenon of complexity is manifested in various aspects of human activity. At almost every step during the lifetime a person uses the following phrases: it is difficult to recognize, it is difficult to understand, it is difficult to imagine, it is difficult to do, etc. Difficulty is everywhere. It is the property of most objects and phenomena of the living and non-living nature. The emergence of cyclones and anticyclones in the Earth's atmospheric layers, the development of cells and organisms, the creation and destruction of ecosystems, the activities of companies, markets, public organizations and governments, the distribution of computer systems and the Internet and many others are the examples of complex forms and structures. It is worth noting that complex systems are quite diverse in nature, they are characterized by different temporality of development, special features of functioning, etc. Therefore, the results of the study of some systems cannot be extrapolated to the sphere of others, since this will lead to difficulties in a comparative analysis of evolutionary processes in various systems. In addition, the analysis should anticipate and monitor the development and operation of a particular system by many parameters, which involves the use of a large amount of various factual material. Thus, complexity is regarded as a universal concept rather than an objective one. It does not apply to something specific or nominal, but it is a property of

various objects, phenomena, systems and subsystems of the world. This is one of those intuitive concepts that can hardly be formalized. In everyday life, this term is usually used to refer to something confusing, incomprehensible and difficult to perceive. In the scientific context, the term receives a somewhat different semantic load, which varies depending on the types of rationality. Holland's (1996, 2000) scientific ideas are an illustration of this thought. He was the first to develop the theory of schemes (patterns), which substantiated the theory of genetic algorithms. The core of his idea was the recognition of new possibilities of order and systematicity, that is, the recognition of stereotypeness in its non-stereotypeness. Systems are always procedural in nature. And it is their procedural feature that testifies to variability and development in change and process (Holland, 2000). These ideas have made it possible to look at the development of a number of social structures from a different angle, in particular to refute the false idea concerning self-organization of large economic systems (Holland, 1996).

Problems of complexity are one of the key issues in modern science and philosophy. Their development takes place in the context of trans-disciplinary and trans-paradigmatic discourse. The multidimensionality and multiplicity of interpretations indicate the multifunctional nature of the complexity phenomenon. In particular, scholars Budanov (2003), de Rosnay (1979), Kizima (2011), Knyazeva (2012), Voitsehovich (2011) explain this phenomenon not only as the presence of a number of complex object elements, but as their ability to create non-trivial relationships with each other, forming a qualitatively new integrity of a complex object. Accordingly, complexity is not a quantitative phenomenon but a qualitative one, which is based not on spontaneous and arbitrary relationships, but on interdependent or interconnected ones. To know and understand the realities of such a world by reductionist methods is impossible. The complexity is interesting and phenomenal in its complex nature rather than simplistic one. Obviously, other methodological tools are needed to know it and French researcher de Rosnay (1979) draws attention to this fact. In his work, he calls this instrument a macroscope metaphorically. Its peculiarity is that it is able to combine the methods of natural and human sciences as well as to attract a number of techniques in various disciplines. Its unusualness lies in the fact that it is able to combine the methods of the natural sciences and the humanities and to attract a number of techniques from various disciplines. According to de Rosnay (1979) the practical implementation of such an interdisciplinary approach in explaining complex realities is possible through the observance of three principles that reflect a person's cognitive abilities: the ability to perceive, understand, think and act (de Rosnay, 1979). Thus,

unity and diversity are considered not as competing concepts, but as those ones that mutually complement and condition each other. They not only act as a property of a particular thing, but also attest to the multiplicity of its connections with the world. By nature, complex objects, phenomena or systems are holistic, that is, their unity is based on the integrity of diversity and multicomponentity (Budanov, 2003; Kizima, 2011; Knyazeva, 2012; Voitsehovich, 2011). Actually, Knyazeva (2012) draws attention to holism as a fundamental aspect of the complexity. She observes that the combination of parts or elements into the whole results in the emergence of new properties of this integrity that are constantly changing (Knyazeva, 2012). Understanding the procedural nature of this integrity is possible only with special thinking. Morin (1992) calls such thinking “complex”. According to the researcher, its defining features are the development of a dialogue between the definite and the indefinite, the divisible and the indivisible, logics and metalogics, and so on. Such thinking is radical (as it gets into the essence of the problem), multidimensional (as it takes into account the diversity of the whole, recognizing the single), systemic (as it analyses the ratio of the whole and its parts), ecological (as it considers the interrelationship and self-regulatory environmental links with cultural, social, economic, political and natural environments), etc. In his work “Method. The nature of nature” the scientist outlines a general program of teaching the art of such thinking (Morin, 1992).

The holistic character of the complexity nature attests to another understanding of the nature of the simple. As a rule, the number of elements (components) in the system (phenomenon) do not indicate its complexity. The system (phenomenon) can have a nominally large number of elements and be simple. The determining factor is not the size of the set of elements, but the intricacy and the originality of the interconnections between them, which are that “glue” that combines the elements into a single whole and makes it complex. Scholars Cheshkov (1999), Dubina (2015), Ruzavin (2008) believe that in linear studies where the consideration of phenomena (systems) took place according to a deterministic scheme (any reason leads to a certain consequence, when those properties and characteristics that did not fit into a particular scheme or theoretical construction were simplified and leveled and the complexity was considered as a set of parts, as “the amount of the simple”. In their opinion such an approach is associated with the principle of reduction, that is, an attempt to reduce the complex to the simple leveling its unique original nature. However, the simple is not the antinomy of the complex, these phenomena are interdependent and interrelated. The nature of the simple contains the complex, and the

complex contains the simple (Cheshkov, 1999; Dubina, 2015; Ruzavin, 2008).

Complex systems (phenomena) are open, their activity cannot be reduced to the interaction of the parts, which these systems consist of. The openness ensures the existence of complex systems. According to scholars Kizima (2011), Knyazeva (2012), Morin (1992), it is the openness of systems that is one of the essential conditions for their emergence and existence. The openness as a characteristic of the complexity indicates that the objects are not closed or isolated because they are in contact with the outside world. They derive information, energy, certain impulses and suchlike from the environment, that is, what is necessary for their vital activity and creation of further development configurations to maintain the complexity (Kizima, 2011; Knyazeva, 2012; Morin, 1992). Openness testifies to the procedural nature of the system, its ability to change constantly. These changes occur in different scenarios and are possible. The “new order” is born out of a combination of chaotic possibilities arbitrarily. According to Prigogine and Stengers (1984) the growth and development of systems is directly proportional to the degree of chaos they are capable of perceiving and exploiting (Prigogine & Stengers, 1984). This idea found its further development and original interpretation in the views of Waldrop (1993). He refutes the understanding of the world as a perfect structure, when you should only select the relevant universal laws in order to understand it. This understanding reflects the deterministic, mechanistic, reductionist view and it is rather narrow and incomplete to understand the complex processes (phenomena) of the modern world. The world description in mechanical modifications is doomed to failure. An alternative way may be a holistic view of the world that can offer spontaneous “crystallization” of the new order (Waldrop, 1993).

Accordingly, the openness ensures the existence and development of complex objects. Morin (1992) expresses his approach to understanding the openness as a property of complex systems. According to the scholar, complex systems are characterized by both openness and closedness. These states condition each other. The process of opening / closing is regarded as a non-linear process of self-development of systems in which the closedness (to some extent) is hidden in the openness and vice versa. In this combination of alternatives, the possibility of self-organization of the system as a process of self-influence (of a recursive loop) is realized. According to the scholar any complex phenomenon, cognition, thinking contain contradictions that do not destroy the complex, but create it by balancing on the verge of chaos (Morin, 1992).

Scholars Budanov (2003), Cheshkov (1999), Dobronravova (2012), Nicolis (1986) point to the procedural nature of the complexity. They believe that as soon as the object acquires the static signs, it will lose its potential for development and the ability to create new things, it will become understandable, complete and therefore simple. The change dynamics of holistic complexity causes the change of its elements. Not only a complex object is capable of demonstrating unexpected properties, but also its elements and constituents acquire new characteristics. The complexity of a system (a phenomenon) occurs due to its changes, movements, dynamics, etc. It is being rebuilt, changing again and again, generating new meanings, while opening up new facets of the complex world. Deprived of an external organizer, they change their behavior or configuration of development depending on environmental changes, revealing a high degree of adaptability. They gain the ability to change and create new configurations of both personal development and the development of the world due to the internal potential of their system, due to the ability of its elements to constantly create unpredictable and original interconnections as well as to be flexible and dynamic. Due to the constant dynamic reproduction and creation, the stability of the established whole is not lost, but, on the contrary, the dynamics (the process) presupposes this stability, the preservation of its complex nature (Budanov, 2003; Cheshkov, 1999; Dobronravova, 2012). This understanding of the complexity nature is reflected in the research of Nicolis (1986). He considers the system complexity at two levels: structural and functional. If the structural complexity increases due to the increase in the number of interacting elements, then the functional level indicates their intensity and ability to acquire various arbitrary configurations. This functional nature of complexity is important for research as, according to the researcher, it reflects the ability to design and create new transitions that are implemented through mechanisms of order and chaos. The result of the system procedural self-organization is the creation of a qualitatively new product (Nicolis, 1986).

It is impossible to impose the ways of further development on the complex phenomena and systems. The unpredictable development of a complex system (a phenomenon), the uniqueness of its essence testify to its unstable and non-linear character. According to Budanov (2003), Kochubei (2009) the non-linearity of a system (a phenomenon) implies the absence of a direct, linear dependence between their elements (subsystems). The nonlinearity is one of the principles of a system (a phenomenon) formation, development and existence. In nonlinear systems (phenomena), unlike linear

systems (phenomena), there is an influence of the system (the phenomenon) on itself, its self-organization and self-creation. Therefore, the characteristics of such complex systems (phenomena) depend significantly on the processes that take place in them. The complex system (phenomenon) and its structural elements are not only subordinated to the general, but also show the ability to develop themselves and to develop the system (Budanov, 2003; Kochubei, 2009).

Dobronravova (2012), Malaspina (2012), Moghaddam (2012), Prigogine and Stengers (1984), Simon (1996) point to another methodological principle describing the development as a self-organization of complex objects, namely, “randomness as a complement to necessity”. In the interpretation of the complex systems nature, randomness is devoid of secondary significance (Prigogine & Stengers, 1984). In the report “Complexity and Epistemological Noise” Malaspina (2012) analyzes complexity using the concept of noise. The concept of noise, in her opinion, will help counteract the totalizing idea of reducing complex diversity to the only denominator, which accompanied the theories of thinkers in the past. As an illustration of this thought, the factors of epistemological noise are the permeability and porosity of disciplinary boundaries, the presence of linguistic gaps and interdisciplinary tension, the state of incomprehensibility in pluralizing the complex world interpretation, etc. (Malaspina, 2012). In general, the rejection of epistemology and integration of various scientific concepts, according to Moghaddam (2012), is an indicator of the general intellectual culture of the modern scientific discourse. In his view, the unifying plane for the totality may be polysystemic cosmology, in which reality is represented as the infinity of interconnected, but autonomous and autologous systems (Moghaddam, 2012). An interesting hypothesis is put forward by Simon (1996). He states that probabilistic research methods play a significant role in the development of new ideas about the complexity. Wherever science faces complexity or the study of complex and complexly organized systems, probability gains its prime significance. The only possible description of complex systems is a probabilistic description. As an example, there are different types of “unpredictable” behavior of systems and different probabilistic approaches to describing them (Simon, 1996).

Since, the ways of development of complex systems, phenomena cannot be predetermined in advance, then the vital activity, functioning and development of a specific complex object must be considered as a chain of bifurcations with a random selection of potential characteristics and properties

Thus, complexity represents the reflection of the cognitive process itself, which is constantly transforming, generating unexpected meanings and opening up new facets of the modern world. It captures the moment of coherence of changes in the cognitive world, the inner world of the cognizing subject, the ways, techniques, methods of cognition and reflects the essence of modern transformative practices that are included into a liquid and constantly changing reality. Complex systems (phenomena) have a number of properties and characteristics, such as unbalance, non-linearity, openness, ability to self-organization and self-creation, etc. Let us consider education as a complex social system (phenomenon) through the prism of these characteristics.

3. Statement of the main material

3.1. Individual Nature Development of a Person in Education

The above-discussed conceptual ideas present new approaches to the content, purpose and the ways of knowledge transferring. It should be noted that they do not exclude the basic principles and consistent patterns of the educational process, but rather consider its key ideas much broader and deeper, from the perspective of complexly organized systems, “complementing” the possibilities for the educational process development. They show that the results of learning, upbringing, and personal development depend on the action of many factors, and therefore changing several or even one of them can have a significant impact on the educational process and its results. Educational processes are characterized by their uniqueness, unpredictability, openness, which in turn requires a teacher to be highly professional, a flexible management system and the scientific organization of the educational process as well as a probabilistic-prognostic approach to pedagogical results of education. Scholars Hanaba et al. (2019) emphasize that evolution towards a multicultural world determines education as a process of a person’s permanent socialization in the cultural-axiological plane. This approach allows a person “to preserve” his “own self” facing the threat of unification and depersonalization of the globalized world and to choose in the society what is the most significant exactly for him (Hanaba et al., 2019).

The creative origin of a person, his intellectual potential, communicative competence, spiritual and moral orientations become of crucial importance. Therefore, education focuses not so much on the information, scientific, normative, value and activity aspects of the individual, but also on the components that focus on the cognitive,

emotional, psychological capabilities of the individual person, but not an abstract one. It is about understanding a person as *Homo Complexus*. According to Hanaba (2014), complexity of a person attests to the potential diversity of human images, reflects the characteristics of human behavior and the specificity of human reactions in different situations of social interaction, etc. In different cognitive activities a person involves, besides rational sphere, also emotional, sensual and corporal spheres. Its existential nature is expressed and acts in a complex and is perceived in a complex (Hanaba, 2014, p. 139). A person by nature is a multiple unity and unique diversity and he just like “each point of a hologram contains the information of the whole of which it is a part”, (Morin, 1999, p. 39). His complex and unique nature lies not only in a set of characteristics, but in the presence of an obvious and hidden connections between them. The sphere of education is designed to take into account the inner multiplicity of the person’s world, striving to develop his individual nature, to expand his capabilities to fulfill his aspirations and needs, through the pluralism of directions, forms and methods of educational activity. Education aims to inspire, direct and cultivate the person’s individual development. In this regard, Morin (1992) notes that learning should not resemble the transfer of knowledge like a relay baton from one person to another. He considers the educational process as creating the conditions under which the “birth of knowledge” processes become possible for learners. The method is not considered as a priori defined path, but as the process of making this path. In this regard, E. Morin emphasizes that this method should be formed, determined only in the process of the research. This is not a specific, but general program of research and actions. The method determines only the main search direction. Method is what teaches us to learn. Since there is no mirror reflection of the objective world, then cognition is always its specific construction. This understanding of the cognition method is to some extent opposed to the unified methods of acquiring and transferring knowledge, which are reduced to a certain number of rules and regulations for their implementation (Morin, 1992).

The growth of knowledge does not occur sequentially, but randomly, since it is associated with personal experience and the individual nature of a person. The education that takes into account the multifaceted nature of the human self appears as a non-linear and complex system (phenomenon).

Sandu’s (2017) ideas are an illustration of the possibilities for practical implementation of complex problem-solving skills. Considering the features of the human intelligence functioning, the scholar draws attention to a person’s perception of the positive while searching for solutions. He

states that among a variety of problems, a person concentrates on those ones that have positive values and evaluations as a result of the solution. (Sandu, 2017). In general, education appears to be transformative by its nature. According to Hanaba et al. (2020) the educational resource responds to sociocultural changes flexibly and anticipatorily, updates the organization forms of learning. They state that the education development should be based on the priority of creating new knowledge, and not the consumption of ready-made information, focus on the ability to consider problems comprehensively and contextually and outline new ones in familiar situations, be carried out by engaging the personal experiences and life practices of the learning subjects into educational activities, to promote their ability to self-education and self-transformation in order to realize their own life potential (Hanaba et al., 2020).

3.2. Cognition of the Holistic and Complex Nature of the World

The concept of complexity allows to identify the only mechanism for the evolution of systems of different nature, origin. Due to it, the world around us, a person, a society, culture, nature, the universe, etc., are not studied as separate autonomous parts, but as a single holistic global self-organizing system. In this regard, it acts as an integrating factor of natural and socio-cultural knowledge, which allows to implement a multidisciplinary approach to the study of complex objects and processes, to provide the educational interaction participants with the formation of multidimensional and probabilistic vision as well as their understanding. This approach in the educational process makes it possible to provide an integrated, generalized scientific view of the world. It gives an opportunity for interdisciplinary links and integration of academic subjects with other principles, namely: the study of phenomena, subjects from a single methodological position; the identification of their common properties; the formation of a multidimensional vision of the properties of the studied objects. Therefore, integrative education is personality-oriented, it allows a person to learn the world actively and holistically, rather than fragmentarily, to form an intellectually developed and spiritual person. "In the integrative education foundation, the most important things are the approaches, tools and methods of thinking and activity, rather than complete systems of "knowledge about the world", believes Klepko (2006, p. 31). The researcher points out that the integrative education cannot be reduced only to shuffling a deck of knowledge from mono-courses into integrative disciplines: "This is not an extensive unification of heterogeneous things, but an interaction of the monism and pluralism principles, of the systemic and asystemic

principles, of the principles of logic – intuition, accuracy – uncertainty, centricity – acentricity, algorithm – paradox, finally, monoculturalism – multiculturalism in obtaining personal knowledge” (Klepko, 2006, p. 31). This is not about the formation of a certain simplified universal knowledge, but about the creation of the knowledge integrity based on the search for communication nodes as strategic points for combining disparate knowledge and their interaction. The method, which allows you to connect parts into a whole, and the whole with its parts, creates a specific image-gestalt. The configuration of knowledge seems to be a certain cycle, a union that is not reduced to a single meaning, but on the contrary, leads to their new reflection. Perception of the image arises as a whole and is indivisible, since the image is lost. Such an understanding of the nature of perception, cognition, perception of knowledge involves a change in the configuration of educational activity. Gestalt education is considered as the transfer of integral blocks of information, a system of structured logical-graphic schemes, patterns of thinking, etc. The example is the experience of scholars Egides and Egides (2004), who presented a method for the unique acquiring of material of any complexity through logical-graphical structuring in the book “Labyrinths of Thinking, or no Man is Born a Scientist”. The scholar is convinced that it is not the thought that should be simplified, but its presentation and explanation (Egides & Egides, 2004, p. 3). Therefore, gestalt-education can be interpreted as the transfer of integral blocks of information, a qualitative change in thinking patterns as well as a restructuring of the very configuration of the learning situation. It involves not only the transmission of new knowledge, not only the ability to think in a certain way, but also the ability of thinking ways, switching from one gestalt to another, which implies an internal multivariance of thinking and perception of the world. Completeness is manifested when a transdisciplinary gestalt has to protect its specific subject and the perspective of the study.

The knowledge of the world as a holistic one is both an intellectual and vital necessity. The universal problem that concerns everyone is how to access information and build the ability to systematize, organize information into an overall picture, thereby realizing and understanding the depth of world problems. The ability to organize knowledge, make it in-demand and valuable in a huge flow of information is one of the modern education tasks.

Modern researchers have conducted a number of diverse studies concerning the use of modern technical devices by young people in the educational activities. Thus, Rotilă (2018) considers the smartphone not only as a means of expanding the social world, a device that helps to establish

human relations with the world, but as a means of developing consciousness, which helps a person navigate a large amount of information and organize the process of obtaining knowledge efficiently (Rotilă, 2018). Kvetenska and Jechova (2017) analyzed both opportunities and risks of social networks. The scholars point out that network technologies make it possible to manipulate an information resource (not to provide information in full or to distort it). (Kvetenska & Jechova, 2017).

Education should contribute to the development of a common ability of thinking, which includes the ability to understand the complexity, multidimensionality and global relations in the world. Appropriate methods and approaches in educational activities should recognize the complexity and multidimensionality of both a person and social processes. Under such conditions, the educational sphere will return to understanding of a person as a certain monad, which is presented as a unique unity and is the basis of the human individuality.

4. Conclusions

Ideas and basic characteristics of the complexity concept do not reject the main consistent patterns of the educational process. In its context, the educational process appears to be a multidimensional system (phenomenon), which depends on the action of many factors, the change of even one of which can affect the entire sphere of education significantly. Complexity represents the reflection of the cognitive process itself, which is constantly transforming, generating unexpected meanings and opening up new facets of the modern world.

The complexity indicates the viability of the education, which is realized as the capacity for self-organization and self-development in the interaction with the open environment. Accordingly, the educational processes are characterized by their uniqueness, unpredictability, openness and instability. Education as a complex system and its components have no hierarchical subordination, they do not operate according to general laws, but show the ability to develop themselves and to develop the system. Under such conditions, education is considered as an innovative environment that contributes to the formation of innovative characteristics and innovative thinking among all participants in the educational interaction. Such education fosters the spirit of innovation and experimentation, that is, the spirit of this era. Its value for modern education lies in the fact that, firstly, it offers a model of a person's self-development in the rapidly

changing and evolving world and secondly, it addresses the most important worldview problem – a person's search for his place in this world.

It is worth noting that considering the education in the context of the complexity concept will contribute to the effective solution of philosophical, psychological, didactic and other problems that have arisen resulting from complication of the realities of the spiritual, natural and social world. It is clear that no methodological concept is able to bypass the talent and love of the teacher, is able to determine the set of the values and qualities which he needs for successful professional activity, can replace the human culture with the technology culture. Accordingly, the value and importance of the methodological potential of the complexity concept lies in the fact that it offers a model of a person's self-development in an educational and social environment that is rapidly evolving and changing.

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