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СОДЕРЖАНИЕ

SYNERGETIC AS A THEORETICAL CONSTRUCT OF EDUCATIONAL INNOVATIONS IN HIGHER PEDAGOGICAL SCHOOL

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Annotation

The article is devoted to coverage of didactic opportunities of synergy as a theoretical construct of educational innovations in higher pedagogical school. Synergistic approach is characterized as a combination of figurative-intuitive and rational ways of thinking as an internal source of change and development of the educational system. The types of synergy which are used in the process of training of future teachers (horizontal, axiological, functional, operational-training, team, cognitive-creative, reflective) are defined.

Keywords: *synergy, training of future teachers, innovation, innovations in higher pedagogical education.*

СИНЕРГЕТИКА КАК ТЕОРЕТИЧЕСКИЙ КОНСТРУКТ ОБРАЗОВАТЕЛЬНЫХ ИННОВАЦИЙ В ВЫСШЕЙПЕДАГОГИЧЕСКОЙ ШКОЛЕ

Чайка Владимир

Аннотация

Статья посвящена освещению дидактических возможностей синергетики как теоретического конструкта образовательных инноваций в высшей педагогической школе. Охарактеризован синергетический подход как сочетание образно-интуитивного и рационального способов мышления, как внутреннего источника изменений и развития системы образования. Определены виды сенергии в процессе профессиональной подготовки будущего педагога (горозинтальна, аксиологическая, функциональная, операционно-развивающая, командная, когнитивно-творческая, рефлексивная).

Ключевые слова: *синергетика, профессиональная подготовка будущих педагогов, инноватика, инновации в высшем педагогическом образовании.*

Formulation of the problem in general

Priorities of the education related to innovative strategies involve the formation of new personal position, new content of the organization of educational process, a new type of predictive-analytical, design-constructive thinking, a new style of dialogue of intellectual activity.

According to the results of empirical research, teachers are often not ready to implement innovative educational technologies and manage research activities of students. They have not formed the intellectual skills that provide cognitive processes and intellectual-reflexive mechanisms that facilitate self-organization and self-improvement of educational and professional activities. Although most graduates of pedagogical universities possess sufficient knowledge but the level of their intellectual culture is low, their thinking is stereotyped that prevents the formation of innovative thinking and innovative activities.

Relevance of the study is due to the need of solving non-standard tasks, making operational decisions under the conditions of the rapid updating of the pedagogical education,existing of complexpedagogical situations and intellectual unpreparedness of teachers to innovations.

Analysis of recent researches and publications

Analysis of scientific and educational literature shows that innovations in educational sphere acquires a new quality and includes encouraging of cooperation between the subjects of the educational process as a way of improving their readiness for self-development and self-improvement, organization of educational process on the principles of integrity and consistency.

Scientific basis of synergy were investigatedby N. Basov [1], L. Medvedeva [3], I. Menshikov [5], A.Meshkov [4], I. Prigogine [6], E. Solodova [8], V. Kharitonov [5], and others.

Purpose of the article

To prove the features of implementation of the synergetic theory in training of future teachers, ensuring its effectiveness.

Exposition of main research material

Term "innovation" (innovation) translated from the Latin means renewal, newness, change. The analysis of the scientific literature shows that the concept of "innovation" the researchers interpret as:

- purposeful change that brings in a social unit (organization, community group) new, relatively stable elements [6, p. 28; 7, p. 40].
- the result of renovation and transformation of past performance, based on replacing of the existing elements or new additions;
- the end result of the creative activity in the form of new or improved products, new or improved process;
- theprocess of ''creativedestruction''.
- complex socio-cultural process that develops in certain objective laws, interconnected with the history and tradition of the studied social systems and capable of a radical transformation of their structure; social and psychological phenomenon, characterized by a certain life cycle, with particular phases, sequences, and dependencies of cognitive and emotional processes occurring in individuals [4, p. 117].

Consequently, innovation as a progressive result of a creative activity is widely used and leads to significant changes in the life of man, society and nature. Spreadingof innovations means that their perception of individual and social consciousness, the emergence of significant changes which are progressive, manifested in changing of technical means, information technologies, management strategies, teaching systems, as well as new types of behavior, styles of thinking, ways of acting, new social ideas , customs and so on. As a form of reflection of the needs and means of solving of various practical and spiritual purposes, innovation is an important mechanism for the development of man and society [2, p. 20].

Innovation in education is a natural, dynamic and evolving phenomenon. Their implementation contributes to the possibility of solving the contradictions between the existing system and the need for new quality education. For the system of professional training of specialists in educational sector innovation is a condition, agent, form, purpose of educational activities. Only in this multidimensional understanding innovation is a prerequisite for the restructuring of the educational process in pedagogical universities oriented to self-determination, self-development, self-realization, self-improvement of future teachers, their formation as developers of innovative methods, techniques and technologies.

The study focuses on the assumptions of the theory of professional pedagogy and universal concept of human nature, according to which a person is unity and interpenetration of chaos and order, the principle of activity of the learning subject, ideas, reflecting the specificity values of understanding the world. This understanding of synergy is due to specification of professionalactivity of the educator of natural profile and system of his preparation.

Synergistic approach is based on the ideas of system, on integrated picture of the universal world and scientific knowledge in it, where common patterns of development are characteristic for all objects of material and spiritual levels of the organization, nonlinearity (of multiple and irreversibility)

development, deep relationship of chaos and order (chance and necessity), co-evolution as a characteristic of development.

Synergetic is a scientific discipline that studies the laws of self-organization in different systems. It explores open systems which consist of a large number of elements, components or subsystems that interact nonlinearly and inextricably.

The term "synergy" in Greek means "joint action", consistent performance of the system. Synergetic as a model of self-organization provides opportunities for new strategies and style of thinking that contribute to the emergence of non-traditional approaches to existing problems. Synergetic explores the emergence of self-organization in natural processes. The simplest mechanism of self-organization which by additional conditions may develop in the process of self-development consists of several phases. Thus, the first objects behave completely independently, in their mutual movement we canobserve no order. This initial state is described as "chaos" or "confusion." Under certain special conditions, there is interaction between objects and they become participants of agreed collective movement. As a result, disorder is changing the order and the chaos is changed into stable structure, constant relationship between the components is set and the autonomous objects are transformed into elements of an ordered system. This phase of self-organization is relatedto the mechanism of accumulation, associations of elements in the structure. Also, another possible mechanism of self-organization is dissipation mechanism, removal of unnecessary, excessive elements and as a resultthere emerge relatively stable structure-attractors of evolutionary process. The principle of non-linear superposition is formed in synergetic, the essence of which is that the non-linear system that consists of many elements is capable of self-organization in a structure that acquires new qualities, inherent in its components. This quality is called emergence. This is synergy - cooperation, joint evolution - co evolution [8].

The internal state of the system and its components regrouping is of great importance in the process of self-organization.Dissipative structures are characterized by the emergence of order fluctuations - random deviation from the mean. At certain points fluctuations increase which can lead to the destruction of the existing organization. At such turning points (bifurcation point), it is almost impossible to predict in which direction will be further developed: the system becomes chaotic or move to a higher level of order.

The synergy studies not all complex systems but only those which are able to organize and have properties that define their integrity, these properties can not be reduced to a set of properties of the system.

As an interdisciplinary science synergetic recognizes the existence of irrational, intuitive knowledge and the results obtained by exact methods are added by irrational results based on intuition. Intuition can be developed by using a holistic way of understanding the reality. This type of thinking promotes understanding of reality through the creativity [8, p. 77].

Synergetic approach - is the heuristic method of search for new knowledge, the discovery of new truths that do not lean on logic but on intuition, imagination and creativity. Synergetic cognitive vision of the world leads to an understanding of the importance of regular, high-profile actions to accelerate the development and selection of the shortest path to new knowledge in individual creativity and collective aspirations in search of reason.

Thus, synergistic approach involves a combination of abstract and figurative, logical and intuitive, rational and irrational ways of thinking, postulating creative chaos as a necessary element of self-organizing reality (chaos and order are inherent from each other).

This interpretation of the synergetic approach makes it possible to extrapolate the essence of it into pedagogical reality. It helps identify relationships between the acquired and new knowledge, innovation and traditional knowledge in educational reality. The dramatic changes of the traditional elements of the system and their relationships which help to achieve new qualitative state are the goals of innovation in education.

From the point of view of synergy education is a complex system of interrelated and interdependent elements with a certain type of self-organization and self-regulation. Also, education is an open system because it does not only create opportunities for innovative trends in perception from the outside but also provides for their development and consolidation according to the capabilities and needs of the latest methods, techniques, programs, forms of organization, technology, management and so on. Openness of education leads to its innovation, increase of the degree of internal diversity and therefore appearing of internal contradictions. The tension between unity and diversity is the need to support educational innovation and at the same time maintain the unity and common requirements for the results of the educational process, educational content, presented educational standards.

Specificity of synergetic approach is that the contradictions are understood not as flaws but as an internal source of change and development of the education system. This approach involves changing of the content of the education. According to the methodology of synergetic changes in the content and organization of education are aimed at finding new ways of structuring its system, updating teaching methods based on independent cognitive activity of students acquiring the capacity for self-study of other views, independent productions and solving problems, especially in a workgroup, group discussions and more. This involves identifying the complexity of multiple situations, involving an integrated set of techniques that implement logical-abstract, figurative-intuitive and cognitive abilities of the individual. The ability to see the problem, choosing the adequate option of its solving requires awarenessof integrityof the situation, relationship and unity of its various aspects, the focus on its development, the variability of impacts on it. This will help the future professional of the educational sector in orientation in situations of social instability, highly reflective display of behavior, learning patterns and elements of multicultural environment of modern society [5].

The theory of self – construct is the most productive for creating innovations since revealing the possibility of complex systems to create new structures,it explains the evolutionary processes of spontaneous chaos. The process of formation and development of innovation from the perspective of theory of self-organization is a nonlinear process of spontaneous order. Innovation, which occurs as a deviation, is an innovation in the process of its implementation. This formation is associated with self-organization of new structures which resist traditions. The advantage of innovation over tradition becomes the impetus for new, alternative order of parameters that govern the logic of self-organizing systems. As a result, under certain conditions, the system is upgraded to a new level, characterized by a new order of parameters. The contrast between innovation and tradition is interpreted as a conflict, during which the selection and implementation of innovations, which in this context is alien to stable structures of elements of instability and chaos that has destructive potential. On the other hand, innovation in the process of establishing and development initiate processes of self-organization of the system and is its inherent element for the processes of self-renewal and self-structuring. So, in the processof establishing and development the innovation is "teetering" on the edge of order and chaos, creation and destruction. It is simultaneously the product of purposeful planned activities and result of the interaction of complex structures that are capable of spontaneous self-organization and emergence [1, p. 33-34].

Slastonin B. and L. Podymova focus on the interdependence of traditional and innovative. They believe that tradition is sustained, significant cultural component that is passed to future generations through the mechanism of succession. Innovation is a reality created through the creative activity, the essence of which is in some contrast to the

existing tradition. The emergence of any innovation is possible only under conditions of stable tradition. Therefore, we can state that the tradition and innovation are in constant dialogue [7, p. 29].

Consequently, traditional and innovative are complementary components of the educational process, as their interaction leads to a new quality of the system. Innovation as an imperative and system-characterization form is both objective, condition, principle, mean, form, method, technology of education. Only under such multidimensional implementation in a didactic system innovation will create conditions for the development and continuous support of teacher-innovator as a creative individual with a particular style of teaching and thinking. It is vital for building the didactic system that combines traditional and innovative to find a combination of variant and invariant components, organic relationship of which will ensure the teacher scientifically based and innovation-oriented professional development.

It is important for the educational process to be built on understanding and predicting patterns of development. Any development is an objective process and involves the transition of the system to a new, more sophisticated level, characterized by both quantitative and qualitative indicators. As a result of development, a new qualitative state of the object that is the result of changes in the composition or structure (origin, transformation or disappearance of its elements or ties) and associated with the transition of quantitative to qualitative changes.

Synergetic approach that strengthens the idea of self-awakening of own forces and abilities of future teachers, initiating individual development is the creative principle of self-creation processes. The following types of synergies are generated in the process of training of future professionals of the educational sector, in the integration of various sciences and their specific professional activity:

- horizontal (additional educational programs) and vertical(levels of skills) integration in the educational sphere based on external information helps to predict the needs of innovative changes and promptly update the contents of the variable part of educational training programs and structures of competence, and for the individual - creation of strategies of personal and professional development (strategic synergy);
- axiolohizatonof objectives, content and results of intellectual activity, formation of intellectual culture, involvement in the processes of innovation, awareness of a person belonging to a professional community motivates self-development, the desire for creative self-realization, personal and professional self-improvement (motivational synergy);
- involvement of future specialists in creative activities at all stages of training, in a real professional work in the conditions of educational process which promotes active formation of professional skills (functional synergies);
- transformation of competencies among the participants of the educational process, while mastering the skills of some individuals promotes the assimilation of others ways of professional and personal self-development (operational and developmental synergies);
- integration into the team skills of different individuals in the process of joint problem solving task creates the possibility of each entity to observe the work of others and encourage their own intellectual activity (team synergy);
- diversification of teaching methods and the possibility of scientific research provide the opportunityfor future specialist to receive effective results, to realize their intellectual and creative abilities (cognitive and creative synergy);
- the potential educational practice and the plurality of communication create opportunities for the development of reflexive mechanisms (reflective synergy)[3, p. 69-70].

Conclusion

Thus, the result of synergies is the emergence of a synergistic effect that causes a new quality of professional training of the educational sector. The implementation of synergetic approach in the context of innovation in education helps to ensure the integrity, consistency, efficiency, alternative, enhancement and optimizationof the educational reality.

References

[1] Basov N. Protsessualnaya model stanovleniya i razvitiya inovatsii v sotsyalnoy systeme / N.V. Basov // Izvestiya Rossiyskogo gosudarstvennoho universiteta imeni A. I. Herzena - 2008. № 74-1. - P. 33- 38.

[2] Karpova Y. A. Vvedeniye v sotsiolohiyu i innovatiki: Utchebnoye posobye dlya studentov vuzov /Y. A. Karpova. S. Peterburg. : Peter, 2004. - 192 p.

[3] Medvedeva L. D. Synerhetycheskyy efekt v razvivayushchey srede obrazovatelnoho prostranstva podhotovki ekonomistov / L. D. Medvedeva // Innovatsiyi v obrazovanii. - 2012. № 2. - P. 66- 71.

[4] Meshkov A. A. Osnovnyye napravleniya issledovaniya innovatsii v amerykanskoy sotsiologii / A. A. Meshkov// Sotsyolohycheskye issledovaniya. 1996. № 5. S. 117,128.

[5] Obrazovaniye: strategiya razvitiya i sinergetika [electronic resource] / V. A. Kharitonov, A. V. Sannikov, I. V. Menshikov. Access: http://spkurdyumov.narod.ru/ Haritonova.htm.

[6] A. I. Prigogine Novovvedenyya: stimuli and prepyatstviya (sotsyalnye problemy innovatiki) / A. I. Prigogine. MM: Politizdat, 1989. 346 p.

[7] Slastenyn V.A. Pedagogika: ynnovatsyonnaya deyatelnost / V.A. Slastenyn, L.S. Podymova. MA: Magystr, 1997. - 224p

[8] Solodova E.A. Noviyemodelivsystemeobrazovaniya: Synerhetycheskyy podhod: uchebnoe posobye / E.A. Solodova; predysloviye G.G. Malinetskii. - Moskva: KnyzhniyDom "Librokom", 2012. - 344 p.

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