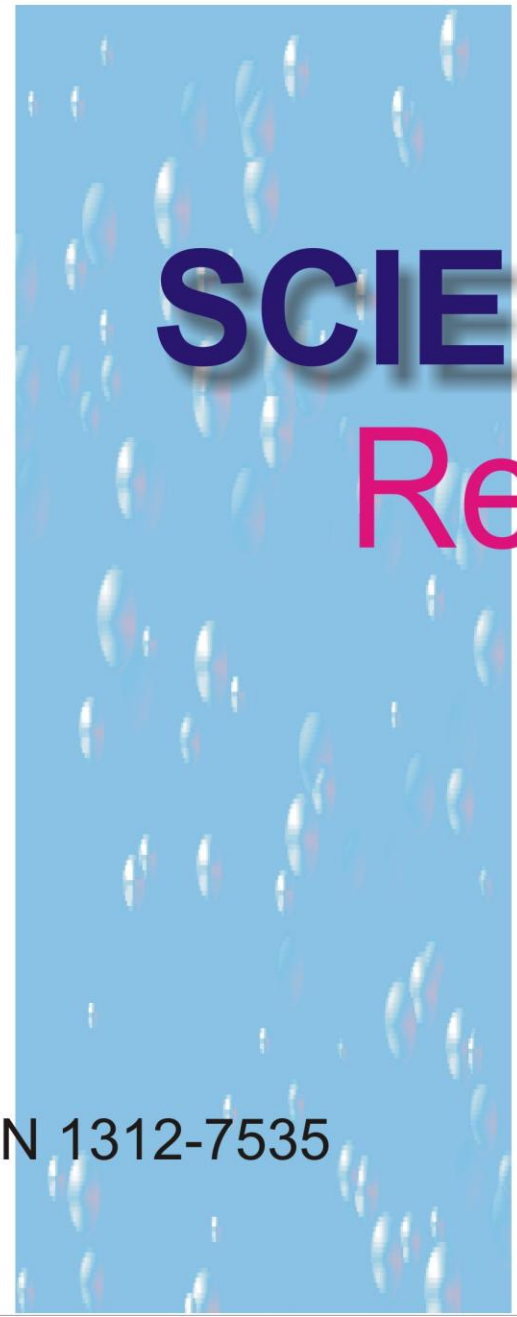
SOUTH-WEST
UNIVERSITY
·NEOFIT RILSKY·
BLAGOEVGRAD, BULGARIA

VOLUME 9
2011



SCIENTIFIC Research

ISSN 1312-7535

ELECTRONIC ISSUE

The Interdisciplinary Dialogue as a path to evolutionary growth of the pedagogical knowledge

Dr. Krassimira Teofilova Marulevska
South-West University "Neophit Rilski",
Blagoevgrad, Bulgaria

My research efforts during the last ten years were provoked by the extreme scientific challenge that the implementation of the synergetic approach into the pedagogical theory and practice represents. My research activity is an attempt to reveal the practical possibilities for the realization of the synergetic approach into the educational process of primary school students. Two main circumstances provoked this investigation. First, it is namely the need to overcome the rational-reproductive approach in the educational process and to create an atmosphere for self-realization, self-development, self-recognition and maximum development of the personal potential of the primary school students. Second, certain conditions for encouraging of the self-organization processes are at hand, viewed in the light of the synergetic understanding of the complex dynamic systems in the educational process of the primary school students.

The aim of the investigation is to create a model variant of a project-based educational activity for primary school students applying the synergetic approach in order to ameliorate the quality of education. The research hypothesis is connected with the possibility for amelioration of the educational quality in the primary school classes via: 1) implementation of the synergetic variant of the project-based activity into the educational process, including the mechanisms of self-organization on the different hierarchical levels of the educational process; 2) independent students' involvement into important personal problem-solving activities in the context of the synergetic interaction..

The present material represents the theoretical and the practical background of one of the possible ways for implementation of the synergetic ideas into the real education.

The interdisciplinary method as a scientific approach

The present day problems are marked by the coherence and the lack of linearity. The tasks that everyone faces are in some way incorporated into the global problems of the mankind. We begin to realize clearer our own existence as an integral part of that of the others, somewhat as a co-existence in a multilateral complexity of the surrounding environment. The global character of the problems related to the present and the future of the human race requires an adequate new thinking capable of encompassing the present day problems in their complexity. The conviction that the narrow specialization does not allow integration into the global problem-thinking and hinders the formation of the overall concept of world knowledge gains its positions.

The new socio-cultural environment evokes new requirements concerning the preparation of the contemporary person. The erudition today is expected to turn into a synonym of flexibility and of variation possibility combined with high competence. The French scientist E. Morin states correctly that the present day education should overcome difficulties caused by the fragment based knowledge by using the natural capacity of the

human brain to contextualize and to integrate. The present day human being is challenged by the knowledge expansion and the progressive growth of information together with the complexity and the integrity. (Morin, E. 2000, 10-12) The problem of mastering of information and its rational use is becoming more and more popular. Education faces the need of knowledge organization and the need of gathering of the scattered knowledge. Furthermore knowledge integration should turn itself into a foundation for the global environmental thinking.

Special attention needs to be paid on the division of "the two cultures" (borrowing Ch. Snow's term) – science and humanities, which has been seen as a great challenge facing the education today (Snow, Ch.P., 1985, 195-226). I. Prigojin and I. Stenger underline the need to establish a relation and to make an intensive cultural dialogue between science and humanities in their book "The New Relation. Metamorphosis of the Science". It is quite possible for a completely new process to take place – the formation of a "third culture" that provides the conditions for that dialog to happen via mathematical modeling borrowed from the natural sciences and the theoretical and the practical experience of the human society (Prigojin, I., Stenger, 1989, 54).

The reasons for the alienation between the natural sciences and the humanities should be traced back into the different way of interpretation of the phenomena. The centuries-long human history and the development of the human culture are eloquent confirmations for the need of harmony between the rational and the moral, the intellectual ant the emotional.

The rapid development of the technology brings into light the need of the moral values and the aesthetic categories to enter the field of science. Humanities are also obliged to implement the inventions made by the natural sciences but considering the emotive side of the human character. According to I. Prigojin one of the present day problems is to overcome the conceptions related to academic isolation. The scholar states that new channels between science and society should be build. He also puts forward the idea of new conception for the nature and the rejoining of the human culture back together. (Prigojin, I., Stenger, I. 2003, 30)

This is exactly the place to quote the position of I. Prigojin and I. Stenger on the new science conception and the way it treats reality:

„We are on the way to discover new synthesis, new conception of nature. It's quite possible to merge the west tradition with its quantitative approach and experiments with that of China and the notion of ever changing world" (Prigojin, I., Stenger, I. 2003, 30-31).

Building "bridges" between science and humanities needs a new ideology and a new meta-language. The theory of the complex systems, namely the synergy, represents a new methodology and universal approaches for analyzing the complicated problems of the present days. The interdisciplinary approach will undoubtedly play an important role in the science of XXI century. The synthesis of sciences will end up to fundamental discoveries, inventions and creation of new technologies. The concept of nature and society will change drastically. The interdisciplinary approach puts the stress on the systematic character of the different objects that have been analyzed by the science. It also stresses on the interrelation between the processes and the phenomena in our reality.

This interdisciplinary idea naturally faces methodological and terminological difficulties in its way of realization within the concrete research analyses. As a methodological approach, the interdisciplinary idea presupposes great use of the scientific information from different spheres, in fact a real synthesis of the scientific inventions. Theories that reflect the objects systematically are called natural. They take into consideration a whole complex of reasons related to the object.

Bearing in mind the new pedagogical reality, the interdisciplinary approach accentuates on the need to build a whole conception of the educational process via synthesis of all scientific inventions and establishing constant relations between the hierarchically formed structures. The main factor in the social sciences, including pedagogy, is the philosophy that enables the free movement of ideas from natural sciences toward the humanities. On the one hand, philosophy generalizes the scientific inventions and builds a system of rules, and on the other hand, it influences the different scientific branches while playing the role of a methodological ground for the human knowledge.

Education today is expected to overcome its traditional function namely to teach social experience and to play a leading role in prevention and preparation of the human being to deal with crises and what's more to define the future way of living. The international academic discourse is still further confident that in searching for new, adequate educational models for our society, the theory of the complex non-linear systems (*synergy*) will be applied.

Interdisciplinary dialogue – evolutionary growth of the pedagogical knowledge

The synthesis of the scientific knowledge, the revival of the lost harmony interaction, the mutual penetration of natural sciences and humanities and the drastic change in our thinking are all parallel conditions for the mission fulfillment of education. In constant searching for the optimal variant of its content and structure the educational system today is trying to play an important role in society and its development.

The modernization of contemporary education and the choice of further development that is adequate to society today can be realized via scientifically based methodology. Many scholars point synergy with its evolutionary mechanisms and self-organization processes in non-linear open systems to represent the new methodological ground in contemporary education. Among them are: S. P. Kurdjumov, E. N. Knjazeva, V. G. Budanov, G. G. Malinetski, V. A. Arshinov, D. S. Chernavsky, V. F. Razumov, V. S. Stiopin, A. P. Kuznetzov, G. U. Rizichenko, B. N. Poizner, R. G. Barantsev, T. S. Nazarov, V. S. Shapovalenko, I. Marev, I. Ivanov, S. Grozdev, M. Tasev, B. Lalov, etc.

Synergetic methodology allows the variety in the educational system to be viewed as a source for its development. Synergy allows us to formulate its interaction principles not only among the educational system itself but also among the different education institutions and the society as a whole.

The synthesis between synergy and pedagogy does not presupposes mechanic transfer of ideas from science into the humanities but a creative application of fundamental, methodological principles that influence different complex dynamic systems e.g. physics, chemistry, biology, sociology, etc. The synergetic representatives deal with the many sided integration of pedagogy and synergy.

The new ideas are in unison with the new priorities in contemporary education. The science that investigates the mechanisms of self-organization in the complex systems orientate the teacher to master the internal points of human life, they help him to grasp variety and alternation of human-nature evolution. Synergetic approach offers new possibilities for effective management of the complex non-linear dynamic processes in the educational system. The educational system characterizes itself with hierarchically formed structure and capability of self-organization.

The *prognostic function* of synergetic approach is of paramount importance. The synergetic ideas can serve as methodological ground for problem-prognosis of the educational system and its compound levels. The synergetic application enables the formation of choice criteria for dealing with crises in the educational process which is an integral part of the non-linear dynamic pedagogical structures.

The place of the new scientific current in the educational system is firstly connected with the implementation of the synergetic knowledge and the acquiring the rules for self-organization of the complex systems and secondly it can be used in the education itself.

The non-linear complex structure of the pedagogical system and its components is fully realized in the ability to react strongly to small influences according to its own internal development tendencies rather than to concrete intensive and ruling ones. The synergetic conception and the mechanisms of self-organization help to grasp the meaning of the complex pedagogical phenomena. It also helps us to form the different pedagogical models.

The scholars of S. P. Kordjumov's circle have a valuable contribution to the application of the synergetic idea in the humanitarian sphere of knowledge. In the beginning of XXI century they developed a whole integrative conception for the content of the uninterrupted humanitarian education on the basis of the interdisciplinary approach and the synergy in particular.

V. G. Budanov outlines three aspects of the synergetic application in the education:

- *"Synergy for the education*", It deals with the implementation of synergetic knowledge into the different degrees of the educational system;
- *"Synergy in education*" – It presupposes that the synergetic principles will be applied in the natural science disciplines and the humanities as well;
- *"Synergy of education"* – It accentuates on the synergetic character of the educational process itself (Budanov, V. G., 1994, 16-21)

There are many examples of deliberate application of the synergetic conception in the contemporary pedagogical theory and practice. There is also a positive experience in teaching synergy in the universities and the high schools in Russia. The students of humanities are taught synergy as an integral part of the natural science disciplines. Special attention should be paid on the synergetic project at Moscow High school №363 launched in 2001.

A long year study on the ways of implementation of synergy into the academic education is performed by the scholars at South-West University "Neophit Rilski", Blagoevrad. Among them are: M. Tassev, P. Bozarova, I. Ivanov, G. Tasseva. The ideas of self-organization are welcomed in the high school education as well. S. Grozdev

undergoes a research analysis related to the implementation of the synergetic ideas in the preparation of high school students for maths competitions.

The contemporary society challenges the education and this is the reason for the need of new educational strategies. The synergetic interaction of the traditional values and the new tendencies help the education to meet the new requirements. Synergy represents the knowledge evolution and the educational processes in a new way. It facilitates the new interpretation of the existing methods in the education. The synergetic approach is interdisciplinary by its nature. It facilitates the problem-solving process connected with the personality development in its integrity, dynamics, interrelation and interdependence.

One of the most important aspects of the educational process is to preserve the child's personality. The dialogue approach reveals the potential and the personality of every child. This is a kind of evidence in favour of the synergetic approach in the contemporary education. It accentuates on the formation of an active, independent personality that is capable of self-perfection and interaction with people from different cultures and different ideology.

The synergetic ideas fit perfectly into the context of the new pedagogical tendencies towards improvement of the contemporary educational system. In the meaning of the person-oriented pedagogy, various realizations of the synergetic ideas can be found. These ideas are part of the strategic development of the present day education and are mainly related to: the freedom of choice, the variability of the development opportunities, the personal potential, the integrity and the interaction. The modern tendencies and the already outlined priorities in education confirm the need to find sources to apply the synergetic method.

Broadly speaking the practical realization of the new interdisciplinary method should be traced in the synergy between the new and the tradition in the educational process. The synergetic interaction between the established traditional values in education and the new methods, forms and approaches results in a complicated pedagogical structure where personal potential plays an important role in the pedagogical process.

The experimental work performed by the author of the present article confirms all that has been said above. The ideas of self-organization have been used in 2004 / 2005 academic year while trying to work out the ways of implementing the synergetic methods into the educational process. A model variant that aimed at stimulating the synergetic potential through project work has been created. The effectiveness of the synergetic variant of the project-based primary school education has been proved experimentally. The results showed the potentials of the project-based method for the whole personal development of the students and their behavior in the changing interactive complexity. These results pointed out one of the ways of the implementation of the synergetic method into the education as well.

It should be mentioned, of course, that the ways of implementing self-organization methods in the educational process are various. Analyzing the pedagogical practice, the teacher is fully capable of interpretation of this bounty of the pedagogical deeds, interactions and events. The next stage is to find out the concrete possibilities to ameliorate the educational process via synthesis of the tradition and the innovation.

The project-based method – a path to implement the synergetic approach in the education

The project-based method is in accordance with the development strategies in the education. It puts the stressed on the intellectual potential of the person together with the moral values. The project-based method allows the students to be active in their own personal development. There are many examples in the history of education that show the implementation of the research methods into the practical work of the students. The traditional ways in education still prevail. The student is viewed as a recipient of information and the task is just to reproduce knowledge. The evaluation process still has a quantitative character. In order to reach the intellectual stage of each personality, the knowledge should be interiorized. The interiorization of knowledge passes undoubtedly through the active engagement of the student in an activity that is related to already mastered pieces of knowledge into the concrete problem-solving tasks that lead to the acquiring of new knowledge.

The choice of the project-based method as one of the paths to implement the synergetic idea into the educational process is set up on the great possibilities that it offers. The project-based method incorporates high synergetic potential. Its practical realization is related to integrative processes on different *levels*:

- *theoretical* – the integration of knowledge (concepts, theories, conceptions) from different scientific spheres, their mutual enrichment and fulfillment that enables problem-solving activities in the global environmental context;
- *practical* – the integration of skills and habits into the process of mastering of meta-cognitive skills needed in the complex world of interrelated processes and phenomena;
- *methodological* (in its narrow sense) – The synthesis of methods, forms and means in the process of education which is non-linear and dynamic by nature;
- *social* – the integrative processes happen on the level of:
    - interpersonal relations in the educational process;
    - the components of the pedagogical system and the elements of the social environment (educational, scientific, cultural institutions; government and non-governmental organizations, parental organizations, business environment, etc.)

The project-based method improves the quality of the educational process in the light of the above mentioned integrative interactions. The positive sides of the project-based education are:

- helps to individualize the education (bearing in mind the concrete, individual needs of the students);
- gives the opportunity of the students to form their own educational path, their own rhythm of development;

- stimulates the students to use the acquired knowledge into different problem-solving activities;
- helps the students to master new knowledge, to improve their skills and to form competences in the process of an active work;
- helps to improve motivation for further self-development and strengthening of his / her positions;
- puts the interpersonal relations „student – teacher" and „student-student" on a higher level of equality and respect, partnership and mutual understanding;
- helps to establish a permanent feedback for discussing the positive and the negative elements of the students' behavior;
- helps the student to create their own reflection on the educational process in order to improve it;
- helps to spare resources and at the same time makes an environment that is closer to that of the real life giving the students chance for self-development and self-realization (see Maslow, E., 2001, 244);
- the creative and the experimental work in the project realization stimulates the development of the students' skills, it forms new competences and motivates further personal improvement as well;
- gives a chance to establish and to improve the communicational skills and the skills to work in a team group while playing different social roles (e. g. that of a leader, of a performer, of a mediator, etc.).

The project-based method matches exactly the synergetic ideas of the conducted self-development in the conditions of cooperative education. This presupposes the foundation of a complex pedagogical system (viewed on the macro level) and a dynamic system of the student's personality (viewed on the micro level). The method establishes its own paths of development that match the internal evolutionary tendencies. The stress is placed on the small and correctly directed influences on the complex system which are in harmony with its own tendencies of development.

The project-based method can be applied very successfully in all of the stages of the school education. Its realization has its specificity, of course, according to the age of the students. The correctly planned, organized and conducted use of the project-based method in the different degrees of education contributes to the whole personal development of the students. The successful application of the project-based work in V-VIII and IX – XII grade will be undoubtedly simplified if the primary school students acquire the experience to work on school projects.

One of the clear synergetic concepts is the point of bifurcation – the moment in which the complex structure (including the developing person) is placed in front of a choice of evolutionary motion forward. The student often passes through difficult moments of choice in the education. The requirements directed to the students in the contemporary school education are constantly increasing. The information pressure is also progressively increasing. The old stereotypes of just producing what has been heard are merely not sufficient in the process of mastering new knowledge and skills as well as in forming new competences needed for the concrete problem-solving activities. The

present day student faces the choice of the mechanical reproduction or either the choice to think independently in order to help his personal development. In this sense the educational process should be organized in such a way that it should stimulate the student's activity for individual work. The student has the chance to apply the mastered knowledge and in the same time to acquire new one.

From the synergetic point of view, the project-based work of the students in the traditional educational system (namely the school, the family, the culture and the society, the media and the flow of information) experience a complete interaction of the educational spheres. The result is the presence of self-organization processes on the different levels: the student's personality, the group of students, the class, the school (in cases when the project-based activity encompasses the whole school), the relation teacher-students, teachers-students and school staff-school management. The development of the self-organization mechanisms lead to quality changes in the respective structure. This resembles in a total harmony of the element interaction. These changes illustrate the evolutionary growth of each sub-system within the complex dynamic pedagogical system.

The cognitive interest of the students nourishes their motivation for active involvement in the self-dependent educational process directed toward important social problem-solving processes. During the project-based work the participants (the student himself, the group of students, the whole class or the teacher) get the chance to realize their personal potential in this interpersonal interaction, they transform each other into real subjects of the intellectual, the moral and the cultural development.

The human personality and the society as a whole represent complex, non-linear dynamic systems that are open to interaction and to information exchange with the environment. The constant increase of the information interaction on the complex system (the pedagogical system and its components) leads to instability. This instability can be even caused by the smallest disturbance. The complex system development comes to a point of choice (a bifurcation), a moment when the system can choose either of the two ways of development and as a result of self-organization processes to turn itself into something completely and evolutionary new.

Based on the synergetic notions of the self-organization, the variant of the model of the project-based educational process allows the students to master new knowledge and skills in the process of the different problem-solving activities. The model is based on the synergetic interaction whose potential is realized by the self-organization processes on the different levels of the pedagogical realities:

- coordinated activity of the subjects in the process of education which represents complex open and dynamic systems, a part of the whole didactic system;
- interaction of the traditional methods, forms, means of education and the innovational interactive method of the project-based work in the class system;

- interrelation and interdependence of the image-based and the logical; the real and the abstract; the quantitative and the qualitative in the realization of the students' cognitive process;
- interaction of the mastered and the new knowledge, skills and competences;
- in the problem-solving activities related to self-cognitive processes and the environment;
- joined activity of the different analyzing authorities in information acquisition;
- synergetic interaction of the different and complex structures that form the flexible and dynamic educational area.

Here we find one of the possibilities of analyzing the quality of education in the process of the students' personal development. From the synergetic point of view the development of the complex system could be successfully analyzed by observation of small number of parameters. The project-based method allows us to observe the following parameters: the cognitive activity; the emotional activity; the social activity.

The cognitive interest has the leading role. Its dynamics influences the self-organization processes of the students' personal development. The growing interest of the students in the process of the cognitive activity related to the project-based work is accompanied by a disturbance in the balance in the respective complex structures on the level of the student, the group of students, the class collectivity. It is realized in the aspiration toward the creation of a concrete final product – the result of the activity. The growth of the cognitive, the social and the emotional activity is a proof for the self-developing processes.

Principles of forming the synergetic variant of project-based educational activity

Having in mind the synergetic variant of the project-based educational activity the main role here is given to the synergetic ideas concerning the unity of the phenomena and the processes from our environment, to the ideas concerning the self-organization of the open complex dynamic systems, to the ideas concerning the mutual penetration and addition of the order and the chaos in the evolutionary development. Another important process is to activate the synergetic potential of the project-based method.

The conception potential formulated by John Dewy in the beginning of the XX century could be further developed successfully in the contemporary school education at all its levels. The stress could be placed on the mechanisms for self-organization of the students' educational process. The self-development process in the educational activity could be realized on the basis of integration of the content side and the interaction on the process side.

The principles are interdisciplinary by nature and this is how *the synergetic model of the project-based work* is realized. The principles are: *the anthropological; the hologram; the recursive.* The *anthropological principle* is related to the ability of the student to choose his individual educational trajectory and velocity of education bearing in mind his own personal characteristics and interests. Philosophically speaking the

anthropological principle describes the human as "a phenomenon that has taken a specific place in the universe". (The New Dictionary of Philosophy, 2003, p.1095)

In the context of the pedagogical realities the anthropological principle realizes itself in the idea of the uniqueness of the student and his valuable personality. Seen as a complex synthetic unity the student's personality needs to be analyzed with the help of various scientific methods. This is exactly the place where the interdisciplinary approach (the synergetic method) should come into action. It enables us to encompass the whole pedagogical process.

The *recursive* and the *hologram principles* have been mentioned by the French sociologist E. Morin as crucial for the new thinking (Morin, E., 2000, 80-85). *The hologram principle* takes into consideration the fact that every element of the pedagogical system at every moment of its development bears information about the system as a whole and vice versa, the system as whole bears information about its elements. The hologram problem and its role in the scientific theory are investigated by many eminent scholars of the synergetic method. They are: S. P. Kurdjumov, E. N. Knjazeva, G. G. Malinetski, V. I. Arshinov, etc. The hologram principle presupposes to find specific characteristics of the complex dynamic structure that are part both of its past and its future. It represents a base for further analyses of the evolutionary development of the respective pedagogical system and its elements. The principle also gives us the chance to fasten the velocity of the system development.

The *recursive principle* realizes itself in the personal self-development which is a result of the creative formation of an own educational product. Under the term *recursive* in the dictionary of philosophy stands the repeating character of the human activity or of a social phenomenon (Kerimov, T. H., 2006). Theoretically the concept of recursiveness presupposes the overcoming of the traditional metaphysic oppositions of the social culture and the individual activity; the production and the reproduction; the subject and the object; the inner and the outer side. The reproduction is structurally incorporated in the production process.

The recursiveness is a condition for reproduction. The social phenomenon incorporates the other, the new. (Kerimov, T. H., 2006) There is a potential of self-development in the context of a complex student personality (viewed as an open dynamic system). The possibility for mastering new methods, competences and knowledge is present in this product activity. The recursive principle realizes itself completely in the project-based work. It incorporates the possibility for knowledge up-grading from the various forms of thought.

The essence of the created synergetic model of the project-based activity lies in the synergy of the traditional and the innovational methods of the different levels. The model has been tested in fourth grade of the primary school education. Variation and invariation elements are present in the realization of the educational process. The invariation part involves educational standards and the curriculum of the school disciplines (mathematics, Bulgarian language and literature, Bulgarian history, biology, art, music). The variation part was created in the process of working on the project-based method founded on the synergetic principles.

The student's personality is placed in the center of the synergetic variant of the project-based education. It is seen as a complex, open, non-linear self-developing system. There has been an exchange of information between the dynamic structure of

the student's personality and the functional oriented didactic environment. This exchange causes periodic malfunctions of the balance followed by disturbances of the mechanisms of self-organization.

The created model of project-based activity is implemented in the conditions of subject-subjects relations that are based on the synergetic interaction between the forming elements of the pedagogical system on the different levels. One of the main points of the synergetic model is the acknowledged chaos in the whole process of acquisition. The student-teacher activity bears the mark of creativity and variation.

The stimulation of the personal potential is extremely important in education. The successful application of the model variant of the project-based activity requires deep understanding of the student's individuality. This enables the teacher to stimulate the student's personality evolution with small and correctly conducted influences.

The teacher faces the task to organize an optimal environment for the interactive process of synergetic communication between the participants in the educational process. The synergetic variant of the project-based work presupposes the situation and the variation character of the lesson activity. Special attention should be paid on the creation of the whole notion of the investigated objects (processes and phenomena) in the process of knowledge acquisition. The mutual addition of view points is of extreme importance. The students' possibility to present, discuss and defend their product is of paramount importance, too. They have the chance to evaluate their own potential and that of the other classmates, too. Mastering skills for mutual control is another characteristic of the project-based synergetic work. Last but not least is the importance of the own activity reflection and that of the others. This is a circumstance for tracing paths for personal development and perfection.

Structure and content of the project-based educational activity in the created synergetic variant

The structuring of the created synergetic model for the implementation of the project-based method is organized by stages. These stages follow the logic of the school projecting, namely the topic choice, the formulation of the problem, the final product, its presentation and evaluation. The technological structure of the students' project work consists of four stages:

- *preparation and planning* of the project activity;
- project *realization*;
- *presentation* of the results;
- *reflections* on the work.

Each of the stages is characterized by the four conditions of order and chaos, namely order, transition to chaos, chaos exit (the self-organization), chaos. *The order stage* is characterized by a relative stability of the respective complex non-linear structure (on the level of "the student's personality", "the students' community" and "the didactic system"). The information exchange between the complex system and the environment causes a disturbance in the homeostatic balance and leads to instability.

The pedagogical reality faces mainly information disturbances related to the lack of information or to great intensity of information. This is *the transition to chaos stage*. From the view point of synergy, the self-organization mechanisms are put into action when the instability factor in the system exceeds certain degree. These mechanisms turn the system into something completely new. The new condition could be realized in new behavior characteristic of the respective complex structure – the finding of a new correct decision, the choice of a strategy, etc.

The first phase of *the preparation and planning stage* of the project-based activity is the discussion of the project's topic. It is obligatory to point out the project's importance for the individual personality and for the community (the group, the class, the school). This stage presupposes an active students' participation in the discussion and the topic formulation. The participants in the project activity are due to define the tasks to be accomplished in order to reach the final goal. Group projects presuppose the formation of small groups for a joined work. Then the tasks have been distributed among the members of the group. The first phase is connected with the choice of the final product presentation. The students discuss the means of forming the results and their final presentation.

The second phase of the project structuring is *the realization stage*. The students execute a planned activity for accomplishing the tasks and reaching the final goal. That activity could be performed individually or in groups. A very important moment in *the planning stage* is the discussion of the intermediate results of the project-based activity. This enables the students to make immediate corrections if necessary. This is a way to have a constant dialogue and information exchange among the participants in the group (the group or the class) or among the members of the whole didactic community. This phase presupposes the formation of the final product of the project activity as well. The participants set the criteria for evaluation of the final results. The realization stage helps the students to mould the final result and prepare the presentation. The place, the time and the way of the project presentation have been set.

The presentation stage is connected with the conditions for the presentation itself: the room, the technical support, etc as parts of the overall psychological comfort of the educational environment. The presentation of the final product requires a certain order observation. The evaluation of the project results is a very important moment. It measures the degree of the product quality according to the beforehand set criteria. The evaluation requires certain evidences and good-hearted criticism. The choice of the presentation form is of a paramount importance for this stage of the activity. It could be done by organizing an exhibition, writing a book, creation of an album (in their traditional form or electronic variants), etc.

The reflection on the work is the concluding element in the structure of the synergetic variant of the project-based activity. It presupposes analysis of the project results. It also defines the project's contribution to the personal development of the students in intellectual, moral, social and emotional aspect. This stage deals also with the forms of popularizing the results of the project activity. Future topics, problems and tasks could be outlined, too.

We should bear in mind that there is a mutual penetration and addition among the different stages in the structure of the project activity. The stage boundary is relatively set and it depends on the concrete project topic that the students deal with. The

functions of the teacher are further more complicated due to his / her responsibility to organize the educational process. What's more the teacher should stimulate the students' individual development by a slight guidance influencing children's own internal tendencies of development.

An important role in the realization of the project-based synergetic model is given to the interaction, the mutual addition and enrichment between the project-based method and the traditional methods of education: verbal, visual, practical, inductive, deductive, reproductive, etc.

The realization of the project-based method in the educational process is related to different forms of activity e.g. group activity, individual activity, project-supervisor consultations, expert consultations, excursions, experimental work, presentation (defense) of the project activity. The individual work could be performed both while working on individual projects and on group projects. Thus the students have the opportunity to cooperate and to work creatively. The participants in the project turn to consult the teacher or the experts on the existing problems. During the work on the project the students feel the support of the competent teacher and a constant dialogue is present. The exchange of information allows them to correct the mistakes. The paths for improvement could be traced. The result presentation and the argumentation of the project-based activity play an important role in the whole educational process.

The information technologies are widely used in the created project-based model of educational activity. Other traditional means are present as well. Such are: the books, the library resources, the audio- and video tapes, the museums, the student laboratory, etc. The electronic means that could be used in the realization of projects are: the computers, the virtual libraries, the interactive television, the multi-media, the mass media, etc (E. S. Polatt, 2000).

The created synergetic variant of a project-based educational activity overcomes the weak points of the classical variant of the project method and its practical realization. It happens on the basis of:

- mutual synergetic addition and enrichment of the educational theory and the practice, of deduction and induction in the process of knowledge mastering, of emotional and rational, visual and logic;
- having in mind the system and the science in the educational process;
- use of the possibilities that the lesson and the class offer together with the project-based activity;
- conformity of the project-based activity and the topic distribution of the lesson content, thus ignoring the meaning of the educational plans and programs;
- new understanding of the role of the teacher as a competent consultant among equal participants in the process of education. The teacher guides the students in their personal development and evolution;
- permanent feedback on the basis of adequate esteem and self-esteem;
- reflection on one's behavior and activity.

Conclusion. The research analysis on the problem of implementation of the synergetic approach for ameliorating the quality of primary school education is an attempt to outline the variety of problems connected with the possible synthesis between pedagogy and synergy. It expresses a tendency for bringing together the scientific and the humanitarian knowledge. Synergy not only reconsiders the knowledge evolution and the educational processes but it gives the chance to see the existing educational forms and methods in a different light.

The results of the practical realization of the synergetic variant of the project-based educational activity proved that it is quite possible to ameliorate the quality of education in the primary school via optimal structuring and content enrichment of the students' activities. Three main parameters have been analyzed in the flow of the pedagogical experiment showing the speed of the students' personal development, namely: 1) knowledge activity; 2) emotional activity; 3) social activity. With the help of the created system of criteria, *a significant growth* of the analyzed parameters has been determined. This enables the author to make considerable theoretical as well as practical conclusions.

The amelioration of the educational quality in the primary classes is possible through the implementation of the created model of educational activity. The students should be actively involved into the independent knowledge activity for solving personally important problems in the context of the synergetic interaction. The implementation of synergy as a methodological background enables the pedagogy to include into its strategy a new research instrument and to enrich its concept apparatus with the universal synergetic images. This undoubtedly would help pedagogy to build mathematical models. That should be considered as a great change in its development and it probably would help to ameliorate the educational system on the basis of effective prognosis.

LITERATURE

1. **Budanov, V. G**. / В. Г. Буданов, Концепция естественно-научного образования гуманитариев: эволюционно-синергетический подход//Высшее образование в России, 1994. - №4, с. 16-21
2. **Kerimov, T. H**. / Т. Х. Керимов, Современный философский словарь. www.2.usu.ru/philosophy/soc_phil/rus/texst/slovar
3. **Maslow, E.** / Е. Маслоу, Мотивация и личност. КИБЕА, С., 2001, с. 244
4. **Morin, E.** / Е.Морен, Мислещата глава. Преосмисляне на реформата. Реформиране на мисленето.изд."Полис", С., 2000, с.80-85.
5. **New Dictionary of Philosophy** / Новейший философский словарь. Издание третье, Минск, „Книжный дом", 2003, с.1095.
6. **Polatt, E.** / Новые педагогические и информационные технологии в системе образования. Под ред. д-ра пед. наук проф. Е.С.Полат, М., АКАДЕМА, 2000.
7. **Prigojin, I., I. Stenger** / И.Пригожин, Стенжер, И. Новата връзка. Метаморфоза на науката, изд. "Наука и изкуство", С., 1989.
8. **Prigojin, I., I. Stengers** / И.Пригожин, Стенгерс, И. Порядок из хаоса. Новый диалог человека с природой. УРСС. М., 2003.
9. **Snow, Ch.** / Ч. П Сноу, Портреты и размишления. Изд."Прогресс", М., 1985.