REPUBLIC OF AZERBAIJAN

On the rights of the manuscript

ABSTRACT

of the dissertation for the degree of Doctor of Science

THE THEORY AND THE PRACTİCE OF THE SYNERGETİC APPROACH TO THE TEACHİNG AT THE LEVEL OF PRİMARY EDUCATİON

Speciality:5804.01 – General pedagogy, history of pedagogy and history of education

Field of science: Pedagogy

Applicant::**Malak Alislam Zamanova**

Baku– 2025

The d work was perfomed at the Department of Pedagogy of Primary Education at Azerbaijan State Pedagogical University.

Scientific Consultant: doctor of science in pedagogy, professor **Lazifa Nagı Gasımova**

Official opponents: doctor of pedagogical sciences, professor **Shahla Gasim Aliyeva**

doctor of pedagogical sciences, professor **Humeyr Huseyn Ahmadov**

doctor of pedagogical sciences, professor **Farahim Balakishi Sadigov**

doctor of pedagogical sciences, associate professor **Kamal Hasan Jamalov**

One-time Dissertation Council BED 2.15 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at Azerbaijan State Pedagogical University.

Chairman of the Dissertation Council: Doctor of Science in History, Professor **Jafar Mammad Jafarov**

Scientific Secretary of the Dissertation Council: Doctor of Philosophy in Pedagogy, Associate Professor **Sharafat Aram Baxıshova**

Chairman of the scientific seminar: doctor of pedagogical sciences, professor **Hikmet Abdul Alizade**

GENERAL CHARACTERISTICS OF THE WORK

Relevance and degree of completion of the topic: After Azerbaijan gained its independence, the changes occurring in all areas of society, democratic processes, the reconstruction of the economy and administration, and the development of all social life required a new approach to education. Like all the countries that were part of the Soviet space before independence, Azerbaijan had been in a closed system, isolated from the civilized countries of the world, and living under complete information blockade.

After the adoption of the Declaration of Independence (1991), the process of building a national state began in Azerbaijan. However, due to the lack of political maturity, management experience, and capability, chaos and disorder became apparent. According to the theory of self-organization, one of the main concepts of the synergetic approach, chaos in some cases is not necessarily destructive, but can play a regulatory role. With the return of the great leader Heydar Aliyev to political power at the repeated request of the people, public and political stability was ensured in the country, and political stability was established in Azerbaijan.

The changes in public relations in Azerbaijani society (the abolition of the totalitarian regime), the establishment of an independent Republic, the abundance of information, scientific and technological progress, and the renewal of the content of education led to the creation of the Concept of General Education in the Republic of Azerbaijan – the National Curriculum concept document. It became inevitable for an education system based not on memorization but on critical thinking and imagination, embracing a non-linear way of thinking to emerge.

The dynamic development of the modern world in the context of globalization should direct education towards the formation of a well-rounded individual capable of solving various problems. In the past, the primary goal of schools was to form an individual with scientific knowledge, whereas today, the global goal of education is to achieve the comprehensive development of each individual, integrating the development of all components of their personality..

The 21st century is accompanied by as the era of education, characterized by the integration of global education systems and accompanied by new approaches to the innovation processes being implemented within the education system, the objectives of teaching and upbringing, the content and methods, as well as the organization of collaborative activities between teachers and students. Among these approaches, the synergetic approach to learning has gained particular significance. This is due to the fact that the synergetic approach serves as a constant stimulant for intellect, imagination, and communication skills, manifesting itself as an issue that motivates personal inquiry and discovery. Galileo Galilei once said:" *You cannot teach a man anything; you can only help him find it within himself."*[1]

The synergetic approach to education involves the formation of synergetic values in students through the teaching of the principles of self-organization theory. Teaching the fundamentals of synergetics contributes to the harmonious development of learners and supports their growth as individuals. The ability to think non-linearly has become one of the key criteria for human development. Mastering non-linear methods of action (or synergetic approaches) leads to the ability to act skillfully and rationally with complex systems, as well as understanding how to optimize one's activities in the context of the non-standard development of various phenomena in the surrounding environment. The objectives of the synergetic approach to education are as follows::

- the unity of nature, society, and humanity, and the laws of the biosphere;
- the mutual relationship between society, nature, and humanity;
- key global issues and their solutions and methods;
- the development of intellectual and practical skills in the study of the evolution of the environment, and the provision of knowledge for improving the state of nature, society, and humanity;

1 Qurbanov F.M. Autopoyezis və sinergetika: sosial təşəkkül metaforaları. Monoqrafiya. Bakı: Adiloğlu, 2007. 486 s.

-the education of an individual aimed at active practical engagement in the harmonized development of humanity, society, and nature, through the understanding of the moral and material world, motivations, needs, ecological and cultural awareness, and the cultivation of behaviors that promote conscious ecological and cultural practices;

- the development of alternative thinking abilities in the selection of methods for solving global problems, through probabilistic and non-linear analysis in non-standard situations;

- the development of non-linear thinking, the formation of a personal attitude towards the environment, and the ability to choose a direction in a rapidly changing, technologized world.;

- the integration of natural sciences and humanities aimed at the comprehension and resolution of global challenges.; .[2]

- teaching the methods of synergistic analysis, forecasting, and modeling of the evolution of specific events where social and natural factors interact.;

In the pedagogical process, synergetics presents the requirement to reflect on and generalize both theories and approaches, as well as research methods.

One of the issues that makes the research relevant is highlighting the fact that the synergetic approach to the educational activities of primary school students is a responsible matter, emphasizing the importance of systematic mastery of education. The integration of subjects taught in primary school ("Azerbaijani language", "Foreign language", "Mathematics", "Informatics", "Life sciences", "Technology", "Physical education", "Music", "Visual arts"), and the hierarchical interpretation of the scientific essence of events occurring in the living and non-living nature (knowing, understanding, applying, analyzing, composing, evaluating), is facilitated by the synergetic approach to learning, which helps students study the universe in a holistic and comprehensive manner.

2 Мукушев Б.А. Отражение идей синергетики в содержании школьного естественно-научного образования.Вестник ТГПУ. 2010, № 2, с.92-96.

The synergetic approach to education creates the necessity to shape students' worldview, foster their creative determination, encourage a tendency toward collectivism, and develop the ability to work within a epistemological environment.

The modern era places a responsibility on schools to create opportunities for the growing generation to engage in independent activity, think critically, become authors of new ideas, and be able to filter tasks through the lens of imagination. In addressing this issue, the synergetic approach to education emerges as a crucial condition. This is because synergetics possesses a system of methods, ideas, principles, and concepts, and it encompasses the content of a new methodological approach.

One of the issues that brings the research to the forefront is the new perspective on the methodological approach to education, which allows for the development of the ability to create ideas and imaginative representations in the growing generation. This approach emphasizes the necessity of a creative perspective on facts, events, principles, forms, and methods. Therefore, the synergetic approach to education, the theory of cognition, and the systematic study of its development laws, along with the education of the growing generation, its harmonious development and formation, as well as national and universal values, and their philosophical, psychological, and pedagogical theories, are brought to the forefront. It is also essential to approach the research from this perspective to address these crucial issues.

The methodology of the synergetics of education is a system that includes the foundations and structure of the theoretical principles of disciplines, the approaches and methods for acquiring knowledge that reflects pedagogical reality, as well as the activities involved in obtaining such knowledge, the evaluation of the quality of programs, logical methods, research work, and so on. Thus, the methodological foundations of the synergetics of education are formed by the theory of cognition, the developmental laws of society and science, the formation of the human mind and thinking, national and universal values, and philosophical, psychological, and

pedagogical theories concerning their unity, organized through a systematic approach.

Conducting researchs point out that the synergetic approach to education is an essential issue that stimulates success in teaching. To date, the synergetic approach to education, which is greatly needed, has not been fully explored in research. It is true that there have been numerous scientific and philosophical studies related to synergetics.

In Azerbaijan, scholars such as A. Mammadov, F. Gurbanov, and A. Abbasov have explained the scientific and philosophical nature of synergetics and engaged with its philosophical direction. Internationally, pedagogy experts such as G. Haken, V. I. Arshinov, V. G. Budanov, E. N. Knyazeva, M. A. Dryuk, R. B. Baranchev, G. Gattinq, S. Toulmin, V. Rimmerli, and others have also explored and developed the philosophical aspects of synergetics.

The object of research.The teaching process at the primary education level consitute it.

The subject of the research.

The object of the research is the theory and practice of the synergetic approach at the primary education level.

The aim of the research. The aim of the research is to investigate the theoretical and practical issues of the Synergetic approach, to determine the significance of the systematic-synergetic approach in education, and to summarize the theoretical and practical aspects of teachers' awareness regarding the synergetic approach.

The tasks of the research:

-to explain the essence and content of the synergetic concept, and investigate the theoretical aspects of the synergetic approach in education;

-to study and analyze scientific-pedagogical and methodological literature related to the topic;

-to conduct a comprehensive investigation of the structure of the system-synergetic approach at the primary education level;

-to analyze the concepts of self-organization, openness, complexity, non-linearity, and inequality within the context of the educational system;

-to determine the place of the methods and principles of the synergetic approach in the teaching process;

-to identify the potential and pathways of implementing the synergetic approach in the teaching process;

-to determine the development directions of teachers related to the synergetic approach and experimentally prove its effectiveness;

-to conduct an experimental study of the synergetic potential within student collectives.

The following **research methods** have been used in the dissertation:

Regarding the problem under study, subject curricula, textbooks, scientific and pedagogical literature on the Azerbaijani language, Life Sciences, Technology, Visual Arts and Music for primary grades were studied and analyzed;

- theoretical (analysis and synthesis, generalization, method, concretization, etc.)

- empirical (pedagogical observation, meeting, questionnaire, interview, conversation),

- experiment (determinative, creative-transformative, verifying).

The main provisions of the defense

-Synergistic education is one of the important tools in enhancing the quality of learning activities for young schoolchildren. Its significance is considerable in the formation of the growing generation.

- By systematically using the forms of synergistic education at the primary education level, determining its methods and directions, and considering the situation of the class, teachers will achieve success by differentiating and adopting an individualized approach.

- By utilizing the opportunities of a synergistic approach to education, fostering students' love for national and spiritual values, and creating an educational environment, the effectiveness of the problem is ensured by applying a work system based on the consideration of collective teamwork.

- The synergistic approach to education allows for the elimination of anomalous conditions and chaos in the implementation of a problem that involves various solutions in teaching.

- The synergistic approach to education stands in a supportive role in helping students determine or change the course of their future life.

- In the humanization of education, the synergistic approach to education serves as the methodological foundation during the application of creative mechanisms.

The synergistic approach to education clarifies the concepts of non-linearity, irregularity, constant change, hesitation, and deviation (fluctuation). [3]

The scientific novelty of the research. Due to the synergistic approach to educationis a new concept in education, has been developed for the first time in terms of its scientific foundations, structure, system, methodological basis, and methods. The possibilities for addressing this issue in textbooks have been identified. Additionally, the necessity and significance of implementing the synergistic approach to education at the primary school level have been justified. In this process, the role and position of the collective have been clarified, and the forms of collaborative activities for students have been defined. The necessity of interdisciplinary integration at the primary school level in terms of the problem has also been justified.

The theoretical significance of the research .The theoretical significance of the research lies in the development of the theoretical and pedagogical foundations of the synergetic approach in primary education, including the justification of the necessity of applying this issue in higher grades. The experimental research can serve as a basis for the development of a program for the synergetic approach in education and for determining the theoretical framework for future research.

[3] Qurbanov F.M. Autopoyezis və sinergetika: sosial təşəkkül metaforaları. Monoqrafiya. Bakı: Adiloğlu, 2007. 486 s.

The practical significance of the research. The outcomes obtained can be used in organizing pedagogical trainings, preparing programs and textbooks. The synergistic approach to education can be used in the process of teaching subjects in all grades of secondary schools. Primary school teachers can use new issues related to the synergistic approach to education in the training process. It will also provide an opportunity to utilize it as a source in the preparation of methodological literature.

Approbation and application of research results. Seven articles have been published in journals recommended by the Higher Attestation Commission under the President of the Republic of Azerbaijan, and four articles in databases related to international abstracting and indexing systems, in connection with the topic of the dissertation. Additionally, the author has presented at 5 international and national conferences, with the texts of the presentations published.

The organization where the dissertation was carried out . Department of Pedagogy of Primary Education of Azerbaijan State Pedagogical University.

The total volume of the dissertation with a sign indicating the volume of the structural sections of the dissertation separately. The dissertation consists of an introduction, 4 chapters, each containing 12 paragraphs, a conclusion, and a list of used literature. Introduction – 9 pages, 15,656 symbols, Chapter I – 50 pages, 93,082 symbols; Chapter II – 35 pages, 68,058 symbols; Chapter III – 104 pages, 175,726 symbols; Chapter IV – 41 pages, 57,687 symbols; conclusion – 7 pages, 13,438 symbols; list of used literature – 16 pages, making the total volume of the dissertation 264 pages, 423,647 symbols.

The main content of the dissertation

In the introduction, the relevance of the topic is justified , the object, subject, purpose, tasks, methodological basis of research, research methods, scientific innovation, theoretical and practical significance, reliability, application and acceptance of the results are concisely indicated.

The initial chapter of the dissertation is entitled **"General issues of the synergistic approach to education"** and comprises three paragraphs.The first paragraph of this chapter is entitled the concept of "Synergetics". *The Essence and Content of the Synergistic Approach to Education.*" Here the essence of the concept of synergetic, its history of creation, the ideas of world scientists about the concept of synergetic are explained, and the word synergetic is narrowly associated with the name of G. Haken, and broadly analyzed as a direction that includes all disciplines that study complex self-organizing systems.

The synergistic approach is the basis of our research.

Synergetics is derived from the ancient Greek word "sinergeticas". Its literal meaning is "collective", "cooperative", "joint activity". [4]

The root of the word synergetic "sin" means "together" in Greek. (for example: synthesis, synchronous, synthetic, etc.)

A review of the dynamics of the application of the synergetic approach gave rise to the following conclusions:

- synergetic can act as a methodological basis in prognostic and management activities in the modern world.

- the theory of synergetic is explained in modern science as a "philosophy or theory of complexity".

- the formation of a synergetic worldview carries not only an educational function due to familiarization with the modern scientific picture of the world, but also serves the goals of upbringing, which is of no small importance.

The topical issue of the synergistic thinking style in pedagogy is its connection with the problem of humanization of education.

- Based on this issue the analysis leads to the conclusion that the predominant direction of humanitarian education is the non-classical cognitive strategy characteristic of it (integrative, synthetic, right hemisphere), while natural science education is primarily

[4] Allahyarova T.B. Sosial sinergetika cəmiyyət haqqında elmlərin yeni metodoloji əsası kimi. Bakı, 2007. s.322.

associated with the development of strict logical rationality (differentiating, analytical, left hemisphere)

Therefore, it would be correct to didactically combine both approaches in training for the formation of a holistic personality.

The second paragraph of Chapter I of the dissertation is entitled "*The formulation of the problem in the scientific-pedagogical literature*."

The scientific approach to this problem has found its reflection in various encyclopedias and special lexicographical publications. Thus, “synergetics” is covered in detail in the modern philosophical dictionary. There, “synergetics” is perceived as a modern theory of self-organization, a new worldview, its connection with the study of self-organizing phenomena, the study of nonlinear, uneven, global evolutionary processes “from chaos to order” (I. Prigogine), buffering changes, the irreversibility of time, the instability of the main characteristics of evolutionary processes.

In the Great Encyclopedic Dictionary, "synergetics" is defined as a scientific field that studies the interaction between structural elements (subsystems) arising from systems in non-equilibrium conditions, with intensive (flow) energy and the environment.

According to the Explanatory Dictionary of the Russian Language, synergetics is defined as a science that studies the emergence of synergism, the term synergism is a scientific theory that unites the knowledge concept of the world and the entire systems, focusing on the collective activity of the components of a self-organizing system..

In the contemporary Western philosophical dictionary, "synergetics" is defined as an interdisciplinary direction in scientific research, emerging in the early 1970s, and this field focuses on understanding the general laws and principles of self-organizing processes that form the basis of systems, distinct from their physical, chemical, biological, technical, economic, or social characteristics.

According to the Great Explanatory Dictionary of the Russian Language, synergetics is a scientific philosophical principle that views nature and the world as self-organizing systems.

In Budanov's view, "synergetics should be applied to the educational process in three directions:"

I.- sinergetika təhsil üçün (SYNERGETICS FOR EDUCATION)Integrative courses of synergetics are available at specific levels of education in secondary and higher schools. These include preparatory, primary, secondary school, a series of fundamental subjects in higher school, a series of special subjects, doctoral studies, faculties for changing and improving the qualifications of teachers, second higher education, and adaptive courses in the Middle Ages.

II - sinergetika təhsildə (SYNERGETICS IN EDUCATION):the application of materials illustrating the principles of Synergetics in various subjects allows the identification of sections in each subject, whether in the natural sciences or in the humanities, that explore the emergence of new phenomena. In these sections, it is desirable to use the synergetic language alongside traditional knowledge. This , in turn, will lead to the emergence of an interdisciplinary dialogue in the future and contribute to the unity of science and culture.

III -the synergetics of education (SYNERGETICS OF EDUCATİON: The synergistic nature of the educational process itself, the formation of personality and knowledge. In this context, particularly in dialogical processes, the post-classical character manifests itself. Examples that we can relate to pedagogical skills and authorial methodologies demonstrate the existence of synergetic approaches. [5]

Scientists, including philosophers, physicists, biologists, and chemists, have written monographs and articles on self-organization processes within the field of synergetics in Azerbaijan. However, it is regrettable that there is a lack of synergetic researches in the field of pedagogy in our country.

[5] Буданов, В.Г. [и др.]Трансдисциплинарное образование, технологии и принципы синергетики.Синергетическая парадигма:Многообразия поисков и подходов . Москва:Прогресс-Традиция, 2000, 536 с.

Synergetic research has been reflected in the Prof. A.F. Abbasov's monographs, books, and articles such as "Renewing Society ", "Modern Scientific Paradigm and Management," "Philosophy of the Social-Political Optimum," "Complexity, Time, Synergetics: General Theoretical Analysis of the problems of Development of Complexity and Complex Systems," and others . [6]

. In the article "Synergetic educational models and their role in teaching" by Azerbaijani scientists Prof. A.B. Mammadov, A.D. Zamanov, I.N. Ismailov is the main goal is to explore the possibilities of applying synergetic principles to modern educational models.

F.M. Gurbanov has written several monographs on various problems of synergetics. In the author's monograph "Synergetics: on the verge of chaos" the subject, conceptual apparatus, rationale and principles of synergetics, its interaction with philosophy, the problem of time and irreversibility, the new meaning of demerminism, the understanding of the categories of necessity and chance in the synergetic context, the problem of globalization of the ratio of the whole and the part are reflected. [7]

T.B. Allahyarova's monograph 'Synergetics-I. Synergetic Ontology' deals with synergetic ontology, the new philosophy of nature, entropy, the concept of synergetic chaos approached from the position of information entropy in the study of systems, strange attractors, fractals, and the problem of time and irreversibility in Prigogine's non-equilibrium thermodynamics, etc. [8]

Special attention was paid to the synergy of culture in F.T. Mammadov's book "Management Culture".

The third paragraph of the first chapter of the research is entitled "**The Structure of the Systemic-Synergetic Approach.**" In this paragraph is provided information about the concept of

---

[6] Abbasov Ə.F. Yeni metodoloji paradiqma. İctimai inkişaf: Qnoseologiya və metodologiya problemləri. Bakı:Adiloğlu, 2003. s.5-27

[7] Qurbanov F.Elmə sinergetik yanaşma. Bakı:Elm, 2005. 364 s.

[8] Allahyarova T.B. Sosial sinergetika cəmiyyət haqqında elmlərin yeni metodoloji əsası kimi. –Bakı, 2007. s.322.

"system." The concept of "System" has an ancient history. In the 17th-18th centuries, it was used in Ancient Greece in a complex and diverse sense (e.g., the system of nature, the system of plants, the system of signs, etc.).

Synergetics studies systems. Systems can be classified as simple and complex based on their structure. Complex systems are divided into self-regulating and self-organizing systems. Synergetics studies self-organizing complex systems.

The world is made up of systems. Systems are interconnected. Systems are born, function, and eventually perish. Systems strive to survive (lead). Adaptive open systems do not disintegrate.

Systems are complex dynamic structures that can be technical, biological, social, virtual, or other.

The properties of a system do not coincide with the properties of the elements that create it (synergy).

Systems can be in a state of transition, equilibrium or chaos.

Complexity is currently one of the most pressing problems facing people in all fields.

The method taking into account the main characteristics of complex systems and is scientifically grounded is the systematic approach method

A system is itself an element of an organized system. The main attribute of a system is its elements. The second attribute is the connection between them. The third attribute is a component made up of system elements (a subsystem). A system is capacity of having any number of components.

The fourth attribute is the structure of the system. The relationships and connections between the system, its subsystems, and elements, as well as the interactions with the external environment, are part of this structure.

The fifth attribute of a system is its activity, the functional operations. One of the main attributes of the system is also its goal, which ensures its purposefulness.

All the concepts of the systems approach (system, element, structure, connection, organization, management, goals, etc.) serve to

characterize and express the integrative and holistic properties of the discipline from various perspectives and in a constructive manner. .[9]

The systematic approach considers it essential to approach the system from the perspective of elements, structure, functionality, integration, communication, and historical aspects.

. The fourth paragraph of Chapter I is entitled "**The role of a systemic-synergistic approach in the family in preparing young schoolchildren for learning.**"

In modern times, there are two main theoretical positions in understanding the family. According to the first, the family is a social group uniting individuals with unique characteristics, structure and functions, interests, and according to the second, it is a system. Today, a systematic approach to the study of marriage and family relations is especially required. The family is a self-organizing marriage union, a social group that is a household union of people based on blood kinship. The family is a complex and open system. Family members (father, mother, grandmother, grandfather and children) are its subsystems. There is order and chaos in the family. The family is rich in spontaneous (bifurcation) events. The use of systemic-synergetic analysis in the study of the family, which is a social historical phenomenon, is very important. The family is a substantive basis of great importance for society. If the system itself is a social system, then it is an extremely complex formation.

Within society, there is constant mobility, dynamic interaction and connection between structural elements.

The family is an open system, because it is constantly connected with the environment. (school, community).

The family is a self-organizing system. The person who creates the family organizes these systems under the influence of the rules of family activity. According to the systemic approach, in order to study the family, it is necessary to study all its members.

---

[9] Федорова М.А.Педагогическая синергетика как основа моделирования и реализации деятельности преподавателя высшей школы:/дис. канд.пед.наук./– Ставрополь, 2004.170 с.

The family is a complex and open system. The members of the family (father, mother, grandmother, grandfather and children) are its subsystems. There is order and chaos in the family. The family is rich in spontaneous (bifurcation) events. The use of systemic-synergetic analysis in the study of the family, which is a social historical phenomenon, is very important. The family is a substantive basis of great importance for society. If the system itself is a social system, then it is an extremely complex formation. Preparing children for lessons in the family is a complex process. Because in this process, the teaching opportunities and literacy of parents, the whims and inclination of children to freedom, and pampering also play an important role.

Understanding the teaching and influence technologies of parents, the essence of synergistic approaches in education, plays an important role in preparing students for lessons. This can be said based on the results of a survey conducted with parents. It should also be noted that parents themselves are interested in this issue. Especially teachers who teach in secondary schools want to be educated in this area. Taking all this into account, we found it necessary to teach parents in 15 families the importance of a synergistic approach to students' education and the need to master teaching technologies in this direction. Among these parents were working people with lower education, secondary education, and those who held relevant positions in society.

It should also be noted that introducing a child to the complex world of the educational environment is one of the most difficult issues today. Because a child wakes up every day eager to connect to the Internet, play with the phone, and move freely. In most cases, he wants to see reading at a later stage. In this regard, educating parents about children's education is a necessary issue. First of all, let us note that it is necessary for every family to have appropriate conditions for a child to learn.

The first paragraph of the second chapter of the dissertation, titled " **Theoretical Foundations of the Synergistic Approach to Education,,**" is called " *Analysis of the Basic Concepts of the Synergistic Approach..*"

Synergetics is the science that studies the general regularities of self-organizing, complex, open, and non-linear systems. These types of systems, which differ from simple and complex systems that make up the research object of synergetics, are called synergetic systems..

One of the key characteristics of synergetic systems is their complexity. In order to create an intellectual portrait of a synergetic system, we must first address the interpretation of the concept of "complex system.".

1.Some researchers understand the concept of a "complex system" as "poorly organized" or "diffusive systems."

2.A complex system is one that cannot be accurately described in mathematical terms, either analytically or algorithmically.

3.Complex systems are systems whose activities are directed toward a particular objective. [10]

4.Complex systems are systems that lack essential information in their models in order to be efficiently managed. [11]

5.Complex systems are systems composed of a large number of interacting and mutually influencing elements. .[12]

• The unique specific feature of complex systems is that, despite our limited knowledge about them, uncertainties continuously increase over time.

Education as a complex system,

The key elements of this system, namely the teacher and the student, are essential components that interact with each other. The complexity of the system is determined by the diversity of its elements, as well as the types of self-regulation and self-organization.

Education, in its modern sense, is a system. As a self-organizing, complex, open system, it encompasses a number of subsystems and components. The educational system includes subsystems such as

---

[10] Mehrabov A. Azərbaycan təhsilinin müasir problemlər. Bakı: Mütərcim, 2007. 448 s.

[11] MəmmədovaT.B., Məhərrəmova C.H. Sinergetika nədir? Bakı, 2022. 112 s.

[12] Аршинов В.И., Буданов В.Г. Когнитивные основания синергетики // Синергетическая парадигма.Нелинейные мышление в науке и искусстве. Отв.ред.В.А.Копцик. М.: Прогресс-Традиция, 2002. с.67-108.

educational institutions with their levels and stages, governing bodies that manage education, educational programs that take into account the needs and interests of society, cultural and educational organizations, and research centers dealing with the educational issues of learners.

One of the universally accepted characteristics of self-organizing synergetic systems is the requirement for openness. The American cyberneticist Q. Ferster wrote long before the emergence of synergetics as a science: *"If a system does not maintain constant contact with the environment, which is capable of providing it with energy and order, the concept of a 'self-organizing system' loses its meaning.*" One of the key features of self-organizing synergetic systems is openness. Open systems are those that continuously exchange matter, energy, and information with their external environment, maintaining a specific state through this exchange.

One of the key features of a synergetic system is its non-linearity.

The main concepts of synergetics are openness, self-organization, non-linearity, and inequality.

The theory of self-organization includes concepts such as bifurcation point, fluctuation, dissipative structure, attractor, and fractality.

Synergetics includes the theories of bifurcation, created by Henri Poincaré (*bifurcation* – separation, branching), the theory of catastrophes created by Witney Tom Arnold, and the theory of fractals (*fractal* – a self-repeating and infinitely shrinking piece) developed by Benoit Mandelbrot in 1975. The incorporation of these theories and their organic symbiosis (*symbiosis* – the joint activity of different systems) opens up new ways of solving problems. The symbiosis of these theories forms the foundation of self-organization theory by the Russian scientist Ilya Prigogine. [13]

Bifurcation, pedagogical systems occur in moments of crisis — when the future development of the teaching-learning

[13] Пригожин И., Стенгерс И. Порядок из хаоса: Новый диалог человека с природой: Пер. с англ. М.: Едиториал УРСС, 2014. 304 с.

process is uncertain. During this time, alternative possibilities open up. However,the attractor manifests itself in pedagogical systems as a relatively stable state. Open, non-linear environments lead to this state. Thus, it becomes possible to talk about predicting the future — the future of system future state seemingly "attracts, organizes, shapes, and transforms" its current state. [14]

Fluctuation manifests itself in pedagogy as constant changes and deviations that create a state of instability, inequality that hinders the development of pedagogical systems.

Other important concepts of synergy are also quite correctly associated with pedagogical concepts. [15]

One of the main concepts of synergetics is self-organization. Self-organization is the formation and development of a new structure, the emergence of new mechanisms and tools, and the creation of new organizational structures that ensure the horizontal, rather than vertical, interactions between the active elements that constitute the system. As a scientific paradigm, worldview, theory, and ultimately as a scientific direction, synergetics helps to solve complex problems. Synergetics (the theory of self-organization) provides a way opportunity to rethink complex systems, such as education.

The synergetic approach considers the pedagogical world as a non-linear, complex, and self-organizing system. As it is known, synergetics proposes as a core principle of the development of the environment based on non-linear and unequal laws as a core principle. In pedagogy and didactics, this idea can be expressed in the multiplicity or alternatives of choices. Synergetics can serve as the methodological basis for managing the pedagogical process. Synergetics allows us to put forward the thesis that in the pedagogical process, the self-organization of all teaching subjects occurs not only through the self-development of the entire system,

[14] Qurbanov F. Elmə sinergetik yanaşma. Bakı:Elm, 2005. 364 s.
[15] Yenə orada.

not only through the influx of information or energy from the outside, but primarily through the use of its own internal resources.

In pedagogical systems, self-organization necessitates a specific reciprocal interaction between the teacher and the student. This interaction aligns with the developmental requirements of the pedagogical system and is derived from the objective conditions of its operation. Consequently, it enables a deeper understanding of the mechanisms of development within the pedagogical process. In these systems, self-organization refers to a process or a series of processes that foster optimal performance and facilitate continuous self-improvement. An example of this would be the emergence of new methodologies and instructional strategies.

Currently, synergetics, as a relatively novel field of study, examines the processes of self-organization and integrates various disciplines related to nature, society, economics, and human studies. Many scholars recognize synergetics as a new, overarching theory of development.

The view of the world and human beings as complex self-organizing systems within a unified framework allows for the application of the following synergetic methodological principles in the educational system:

-non-linear thinking: The uncertainty of theoretical structures, conceptual and methodological pluralism, and the fusion of abstract-logical and figurative-intuitive, as well as rational and irrational, modes of thought.

-the acceptance of the emergence of chaos as a necessary moment of creativity in the self-organizing reality (order and disorder are presented as inseparable from one another). [16]

Self-organization within the pedagogical system entails a specific interaction between the educator and the learners. This is consistent with the developmental requirements of the pedagogical system and derives from the objective initial conditions necessary for

[16] Чистяков В.А., Баева Т.Е., Бекасова С.Н. Применение статистических методов в педагогическом исследовании. М.: НИИХ, 2001. 81 с.

its autonomous operation. This facilitates a deeper understanding of the mechanisms underlying the development of the pedagogical process.

It can be considered appropriate to characterize the directions for the implementation of synergistic principles in education as follows::

a)in terms of educational content, the formation of the basic concepts of synergetics through acquaintance with the world of complex nonlinear systems, the definition of these concepts and their transfer to other fields of knowledge (social, economic and humanitarian).

Thus, the boundaries between subjects in the educational process are eliminated and the focus shifts from increasing the amount of information to creating and learning a universal model of development.

b) in the organization of the communication process between the teacher and the student, communication has a collegial character.

c) the establishment of the metaprogramming of the interaction of educational programs in the educational environment.

As a result, a comprehensive knowledge system is formed that determines the student's new type of worldview, ensures successful guidance in complex life situations, and provides a model of the educational environment that adapts to the changing socio-cultural conditions. In order to apply synergetic principles in the analysis of the educational process, it is necessary to determine whether education, in general, is a system and, in particular, whether it is a synergetic system.

The second paragraph of Chapter II is entitled "**Methods of the Synergetic Approach to Education".**

The important principle of the synergetic approach—mutual influence and mutual support—is implemented. The pedagogical process, based on the resonance methods of teaching, distinguishes the interaction studied by synergetics, the modern theory of joint activity. (The term was introduced by G. Haken).

The main task of the autonomous search method among the methods is to learn through individual activity. This is a continuous

process. As a result, students identify personal gaps in their knowledge of a particular subject and learn through practice. The practice is designed in such a way that the student is engaged in the search, in active movement, and the actions require learning by discovering the unknown. To implement this method, practical tasks are structured so that the student's actions correspond to a specific algorithm. Above all, the student must clarify the subject part of the task, meaning the disciplinary knowledge discussed in the practical work, for themselves.The information can be both displine-specific and interdisciplinary in nature. It is crucial to identify the interconnections between all parts of the subject knowledge. This part of the student's activity is highly individual, as the level knowledge of the subjects in the teaching process vary. Finally, the determination of the task's objective is essential. In order to achieve the set goal, it is important to hypothesize possible trajectories of actions that need to be taken. The success of the autonomous search method depends not only on the student's level of preparation but also on their physiological age. Students in the 3rd and 4th grades of primary education are more familiar with various habits of independent work, are more organized, and can flexibly adjust the search plan for solving experimental tasks.

The next method is the situational method. We have divided the situational method into two types. The first type is when a specific situation, mostly a problem-based one, is planned by the teacher. The problem created by the teacher must carry a certain informational novelty. Students should solve this problem independently. The second type is when a situation arises suddenly, depending on the solution path of the initial problem. This situation is also solved independently by the students, but in some cases, with the teacher's assistance, which is related to the necessity of becoming acquainted with a large block of unfamiliar subject-specific information.

The method of optimal solution for an experiment that is practically uncommon in pedagogy. It allows the problem of solving experimental teaching tasks to be viewed not only from a standard perspective but also from an unconventional perspective.

The analysis of the resonance methods listed above allows us to define their main objectives. These objectives include managing the level of students' mental activity and reflection as the core mechanisms of self-organization development. This management is carried out through the group interaction of students during the preparation and execution of experimental research tasks. While working in a collective or group, students react in different ways to external influences, depending on their individual self-organization: group goals, behavioral norms during task execution, group and individual control, etc. [17]

When applying the synergetic methods of teaching, it is important to remember that a crucial factor and ultimate goal of the educational process is to shape the students' self-organization.

The third paragraph of Chapter II **is titled "Principles of the Synergetic Approach."**

Homeostatic principle. Homeostasis is the existence of a program that allows a system to operate within certain boundaries. This program is necessary for the system to achieve its set goals. According to Norbert Wiener, the founder of cybernetics, every system, by its nature, is teleological, meaning it carries a specific purpose for its existence

The Principle of Hierarchy: Our world is hierarchical in many of its qualities. (Hierarchy refers to the arrangement of parts of a whole system from the bottom up). The core meaning of structural hierarchy lies in the differences in nature between the higher and lower parts of the system. Based on existing scientific information, we can confidently assert today that our world is significantly hierarchical in terms of space, time, and energy scales. This means that the fundamental structure of the universe does not take arbitrary values of energy, but rather only relative, step-wise values from quarks to living organisms. The essence of structural hierarchy is that the composition of higher levels is more complex than that of lower

[17] Игнатова В.А. Синергетика как метод познания природы и общества. Экология и жизнь, 1999. № 2, с. 29-32.

levels. For instance, at lower levels of a hierarchical structure, relationships considered to be structured and ordered may function as chaotic at higher levels. Therefore, we say that matter is made up of molecules, molecules from atoms, atoms from nuclei and electrons, nuclei from nucleons, nucleons from quarks, and society from individuals. There are also non-material hierarchies: language consists of words, sentences, and texts; ideas consist of thoughts, views, ideologies, and paradigmsOne important characteristic of a hierarchical system is that complete reduction is not possible, meaning that the structure of more complex hierarchical levels cannot be reduced to the structure of simpler levels. There is a limit to the internal complexity that can be increased at each level of a hierarchical system. The time factor also plays a crucial role in the hierarchy of systems. Haken's subordination principle was specifically formulated for the time hierarchy. According to this hierarchy, the universe is divided into micro, macro, and mega time levels. In science, it has become an accepted tradition that the parameters of structure are collective variables with long duration. These variables govern the short-lived parameters that constitute the language of the relatively lower micro-levels. Above the macro-level, the mega-level is formed from extremely weak variables. The last variables that serve as the governing parameters for the macro-level are called controlling parameters. By gradually changing the controlling parameters, it is possible to change the system at lower levels. In some cases, these changes can take the form of sharp crises. In such cases, it becomes possible to talk about the crisis (bifurcation) value of controlling parametersWhen considering two adjacent levels within the phase of existence, it becomes clear that long-duration variables define short-duration variables, and the higher-level layers define those at the relatively lower levels. It is worth noting that the subordination principle in a hierarchy does not always hold true, and therefore, it would not be correct to absolutize this principle.

Non-linearity: Linearity has been the ideal of simplicity for many generations of mathematicians and physicists, who sought to relate real-world problems to linear behavior. One of the key

principles of synergetics, non-linearity characterizes the transformation phase, the renewal of the system, its passage through consecutive stages of the destruction of the old order, and, ultimately, the creation of a new order [18]

Linearity has been the ideal of simplicity for many generations of physicists and mathematicians, and it was assumed that the motion of a system near its equilibrium state always exhibits linear behavior. Such behaviors are well known from high school courses: the small-amplitude harmonic oscillations of a mathematical dancer or the uniform motion of an object can serve as good examples of linearity. Even in universities, linear problems are predominantly solved, fostering a linear intuition about the simplicity of the world. The homeostasis of a system occurs at the level of linear oscillations around optimal parameters. Therefore, the simple linear state is of significant importance. A defining characteristic of linear systems is expressed by the superposition principle: the sum of solutions results in a new solution; in other words, the cumulative effect on the system is equal to the sum of the results of individual interactions within the system.However, it would not be accurate to imagine the universe as consisting solely of linear systems. In such a world, neither the process of evolution would take place nor would humans exist. The real world is not only linear but also non-linear. Non-linearity is often considered a violation of the superposition principle: in this case, the sum of interacting influences on a system does not equal the sum of the outcomes of those influences. Therefore, it is impossible to simply add up the results of causal factors. This outcome arises from the fact that in non-linear systems, the number of inter-elemental interactions increases faster than the number of elements themselves. In non-linear systems, the relationship between the system's structure and its subsystems is based on the principle of interference, not on the superposition principleProf. Trubetskov D.I. expresses the nature of non-linearity

[18] Azərbaycan Respublikasının ümumtəhsil məktəbləri üçün Azərbaycan dili fənni üzrə təhsil proqramı (kurikulumu) (I-XI siniflər) / tərt.ed. B.İbadova, A.Əliyev, R.Hüseynov, G.Mirzəzadə, G.Məmmədova. Bakı, 2013. 135 s

with the following words: "Among the honorary titles bestowed by scientific progress in our century, the concept with the least harmony, yet the greatest significance and authority, is "'uncertainty."□13, p.12□.

Non-linearity is a concept that reflects multifaceted and colorful phenomena, permeating everything and existing everywhere. It can be found everywhere: from the creation and annihilation of elementary particles to the deafening sound of a shepherd's horn, from the beating of the heart to the warm light of a candle, and from diseases to their treatment. Mathematically, non-linearity is expressed through a non-linear function of one or more variables[19]. In a mathematical sense, non-linearity refers to a type of mathematical equation where the degree of the unknowns is greater than one or the coefficients depend on the properties of the medium. These types of equations are non-linear and exhibit a relationship where the variables do not change in a proportional manner, leading to complex behaviors and interactions.

Openness(Non-closure). This concept involves the inevitability, or rather, the necessity, of a system's interaction with its environment. This principle reflects the existence of mutual influence between the system and its surroundings. E.N. Knyazeva and S.P. Kurdyumov characterize open systems as follows: *"For a system to be open, it must have some source that allows it to exchange matter, energy, and information with its environment"* [20] Therefore, open systems are those that maintain their non-equilibrium state by continuously receiving matter, energy, and information from the external environment. These systems are irreversible, and the time factor is of significant importance to them. In the operation of open systems, both regular and necessary factors, as well as random ones, such as fluctuations (small-amplitude oscillations), play an important role. The openness of the system leads to the dissipation (scattering)

[19] Azərbaycan Respublikasında təhsilin inkişafı üzrə Dövlət Strategiyasının təsdiq edilməsi haqqında sərəncam. 24 oktyabr 2013-cü il 13 nömrəli sərəncamı ilə əsdiq edilmişdir [https://e-qanun.az/framework/27274]. Bakı: Qanun, 2013

[20] Курдюмов С.П. Основания синерпетики: Человек, конструирующий себя и свое будущее. М.: Дом Книга, 2010. 232 с.

process, which is a necessary condition for the self-organization of the system elements. Open non-equilibrium systems transition into a special dynamic state as they actively interact with their external environment

According to Prigogine, this state of a system is referred to as dissipativity. The elements of open systems continuously receive energy from the active external environment and, through acts of dissipation, begin cooperative and collective actions, spontaneously organizing themselves. The self-organization of synergetic systems occurs through this process.

The Principle of stability – at the point of instability, a system (even a closed system) truly transforms into an open system, becoming sensitive to the influences of other levels of existence and capable of receiving information that was previously inaccessible to it. These moments of instability are referred to as bifurcation points, which are essential in the process of the emergence of new qualities, marking the boundary between the old and the new. The importance of bifurcation points lies in the fact that it is only through them that the system's behavioral choices and fate can be influenced. For this, not power or information resources are required, but rather the smallest of influences are sufficient.The principle of instability, which includes the principles of non-linearity and openness, was long regarded as a defect in the system, and this approach persisted until the emergence of synergetics. Even the smallest deviation from the system's stable state leads to the transition of its trajectory and program to an unstable state. At the point of instability, even a closed system turns into an open system, becoming sensitive to external influences, and can acquire information that it previously could not accept. Such unstable states of the system are called bifurcation points.

Bifurcation points are evolutionary processes that trigger the emergence of new structures and qualities in the system at any given moment, serving as the boundary function between the new and the old qualities. For example, the highest point of a ridge separates one valley from another, acting as the transition point between them. The significance of a bifurcation point is also that, at this point, it is

possible to influence the system's behavior and its fate not by force, but through information, meaning that even the smallest mutual influence can alter the system's choices.In the 1960s, the discovery of simple dynamic systems with at least three degrees of freedom revolutionized our understanding of the complex nature of the world we live in. It opened the way to the study of dynamic chaos, strange attractors, and fractals, leading to a new perspective on the complexity of natural systems.

There are systems that consist entirely of unstable points. For example, when chaos occurs, the system is driven into uncertainty. Synergetics also possesses tools for describing such systems.

The principle of Dynamic Hierarchy or Emergence.This concept refers to the application of the subordination principle to the processes of formation. The formation process here refers to the emergence of order parameters. This, in turn, results from the interaction of more than two levels. This principle in synergetics arises from the generalization of the subordination principle applied to decision-making processes. It is one of the key principles that explains the settlement of the bifurcation point, the system crossing this point, and the dissolution of hierarchical levels.The principle of emergence describes the appearance of new qualities in a system at the same level, along a horizontal line. It is at this level that quantitative changes in the controlling parameters lead the system to a bifurcation point—a critical point of instability where the structure of the system is reorganized. The emergence of new qualities and the disappearance of the old ones at the bifurcation point can only be explained through the unity of micro-, macro-, and mega-levels. At the bifurcation point, the collective variables of the macrocosm and the control parameters return their degrees of freedom to the chaos of the microcosm, increasing its chaotic behavior. Subsequently, through the interaction of the micro- and mega-levels, new parameters emerge at the macro-level.This settlement process can symbolically be expressed as:

mega + micro = macro new

At the bifurcation point, the old macro-level ceases to exist, and at this point, a new macro-level with different qualitative

characteristics emerges through the direct interaction between the micro and mega levels..

A paradoxical result arises at first glance here: the formation of turbulence and vortices in a flowing fluid should not be explained by an increase in chaos or disorder, but rather by the emergence of macro-movements and order. Thus, the bifurcation point represents a momentary boundary between the past and the future, where changes occur at the micro, macro, and mega levels.

The Principle of Observation. This principle is understood as an open, complex epistemological principle. Its application helps to enrich the system of principles of synergetics with philosophical-methodological and systemic interpretations. This principle expresses the limitations and relativity of our perceptions of systems. According to this principle, two types of chaos should be distinguished: the chaos of existence and the chaos of determination. An example of the chaos of existence can be seen in the diversity that ensures the stability of life forms in the biosphere, the slight chaotic behavior of heart rhythms, and so on. [21]

The main didactic principles for the implementation of synergetic education can be listed as follows:

-humanism principle – This principle envisions the creation of an accessible living environment that enables the formation of a new type of thinking person capable of protecting humanity, nature, and saving humanity from spiritual, ecological, and energy disasters.

-humanitarization Principle – This principle is implemented when the existing content of education is restructured by incorporating ideas of nature, society, and universal human values into it.

-ecologization principle – It creates the condition for understanding that the survival of humanity is only possible through the harmonious interaction between society and nature. Every

[21] Буданов В.Г. Принципы синергетики и управление кризисом. В кн. Синергетическая парадигма. Человек и общество в условиях нестабильности. М.: Прогресс-Традиция, 2003.584 с.

thoughtless action by humans in the appropriation of nature's objects could have dire consequences for future generations.

- integration principle – In the design of synergetic education, this principle involves the implementation of an interdisciplinary approach.

This also reflects the universality of synergetics as an interdisciplinary theory, capable of integrating various fields of human theoretical knowledge and practical activities, and emphasizing the unity of humans, society, and nature;

-principle of coordination of educational disciplines – This principle lays the foundation for coordinated educational activities and eliminates repetition of topics and issues in the curriculum.

- principle of variability – It introduces the variety of educational programs that meet the needs of the individual in teaching the synergetic components of education.

- principle of problematicity – It is a crucial condition for the development of synergetic thinking and cognitive motivation in the teaching and educational process.

-principle of systematicity – It asserts that the acquired knowledge reflecting the self-organizing properties and mechanisms of various socio-natural objects should have a systematic structure.

- principle of continuity of educational programs and pedagogical technologies – This principle ensures the continuous development of synergetic culture and the optimal transition of individuals to the next stage of synergetic education. The continuity is based on the fundamental content of synergetic education.

In order to apply the principles of synergetics to the analysis of processes occurring in education, it is necessary to determine the necessity of approaching the education system. For this, the methodology of synergetics should be studied from the perspective of it being an open, self-organizing, and non-linear system.[22]

[22] Назарова Т.С., Шаповаленко В.С. «Синергетический синдром» в педагогике. Педагогика. 2001. № 9, с. 25-33.

The second paragraph of Chapter III of the dissertation, titled "**Opportunities of the Synergetic Approach in Primary Education"** discusses opportunities and methods of using the synergetic approach in mathematics. Synergetics has emerged from the integration of fundamental sciences. In this regard, it possesses a diverse and unique network of methods. During integration, the teacher selects the methods, and these methods serve the expression of the content. Since synergetics is focused on the study of problems, the theoretical aspects of science are taken into account during this process. The use of synergetics results in the formation of new necessary and specific concept. Currently, the regulative parameters, subordination principles, and other concepts that manifest themselves in synergetics have been formed on the basis of mathematical methods. In fact, concepts such as bifurcation, irreversibility, attractor, and others are products of the mathematical methods developed through synergetics. While the concept of "bifurcation" in synergetics takes on new meaning, its essence remains grounded in mathematics. The possibilities created by the new synergetic approach expand the scope of mathematical concepts in terms of meaning and, therefore, can acquire a general scientific status. It is also important to note that synergetics is not a complete mathematical theory. As an interdisciplinary and intrascientific research field, it makes integration in terms of the quantitative-qualitative relationship accessible. In contemporary science, the integrative function taught by mathematics is directed toward this as well. Researchers from various sciences consider form and content through mathematics. Mathematics, within a formal framework, covers different fields with the same formulas. Additionally, it should be noted that in mathematics, integration helps with the deeper study of its content.

The first paragraph of Chapter III, entitled **"Possibilities of a synergistic approach in teaching subjects in primary schools**", is entitled "*Possibilities of a synergistic approach in the Azerbaijani language subject and their implementation*".

Synergetics can manifest itself in the teaching of the Azerbaijani language, as in all fields of science. If we approach the

structure of subject curricula (subject content, teaching strategies, assessment of student achievements) from a synergistic perspective, we can see how diverse its content is.

In the National Curriculum Concept Document regarding the implementation of the Curriculum Reform in Azerbaijani schools in 2008/2009, four content lines have been defined for the Azerbaijani language subject for grades I-IV. Content lines such as “Listening, Comprehension and Speaking”, “Reading”, “Writing”, “Language Rules” ensure the implementation of general learning outcomes.

The “Listening, Comprehension and Speaking” content line forms communication skills in students such as understanding the text they listen to, asking questions about the content of the text, speaking in a planned manner, introducing themselves, and expressing an oral attitude to events. In the National Curriculum Concept Document regarding the implementation of the Curriculum Reform in Azerbaijani schools in 2008/2009, four content lines have been defined for the Azerbaijani language subject for grades I-IV. Content lines such as "Listening and Speaking", "Reading", "Writing", and "Language Rules" ensure the implementation of general learning outcomes.

The "Listening, Comprehension and Speaking" content line develops communication skills in students, such as understanding the text they listen to, asking questions about the content of the text, speaking in a planned manner, introducing themselves, and expressing their verbal attitude to events.

“The goal of primary education in the process of student integration in the "Reading" and "Writing" content line stages is to instill reading, writing and arithmetic skills in students, to form in them primary vital knowledge about man, society and nature, elements of logical thinking, aesthetic, artistic taste and other characteristics.” .[23]

[23] Azərbaycan Respublikasının ümumtəhsil məktəbləri üçün Azərbaycan dili fənni üzrə təhsil proqramı (kurikulumu) (I-XI siniflər). Tərt.ed. B.İbadova, A.Əliyev, R.Hüseynov, G.Mirzəzadə, G.Məmmədova. Bakı, 2013. 135 s.

The development of reading skills ensures the transition to self-education and self-discipline in the future, the development of intellectual initiative, the desire to know everything, the ability to organize cognitive activity.

Among the texts given in Azerbaijani language textbooks for grades I-IV, problem-based learning prevails. In the field of synergetic approach to education, the world (human, society, living and inanimate nature, ecology and the universe) is studied not in parts, but as a whole global self-organized system

The second paragraph of Chapter III of the dissertation is called **"Possibilities of a synergetic approach in mathematics and their implementation**". Synergetics arose from the integration of fundamental sciences. In this regard, it has a diverse and unique network of methods. During integration, the methods are selected by the teacher and they serve to express the content. Since synergetics is aimed at the study of problems, attention is paid to the study of theoretical issues of science. When using methods, new necessary - special concepts are formed. Currently, the regulation parameters, principles of subordination and other concepts that manifest themselves in synergetics have been formed on the basis of mathematical methods. In fact, bifurcation, irreversibility, attractor and other synergetic concepts are created by mathematical methods. Although the concept of "bifurcation" in synergetics takes on a new meaning, its essence in mathematics remains. The opportunities created by the new synergetic approach expand the scope of mathematical concepts in terms of meaning and, therefore, can gain general scientific status. It should also be noted that synergetic is not a purely mathematical theory. As an interdisciplinary and intra-disciplinary research field, it makes integration accessible in the quantitative-qualitative relationship as a whole. The integrative function taught by mathematics in our modern science is also aimed at this. Researchers in various sciences think in terms of form and content through mathematics. Mathematics covers various fields with the same formula within a formal framework. It should also be noted that integration in mathematics helps to study its content more deeply.

In the third paragraph of Chapter III of the dissertation, entitled *"Possibilities of a synergistic approach in the subject of life sciences and their implementation*", it is noted that the diverse subjects taught in primary grades according to the age of the students prepare children for life, shape them as the owners of the country, educate generations capable of preserving the customs and traditions of the homeland, natural resources, and their protection. In this regard, the subject of "Life sciences" also has great opportunities. According to the research we conducted, the subject of "Life sciences", unlike other subjects, does not teach the basics of a specific science. It covers certain elements related to the fields of natural and social sciences. The subject of "Life sciences" is fully synergistic in content.

The subject "Life Science" ensures the realization of the general learning outcomes of four content lines: "Nature and Us", "Individual and Society", "Spirituality", "Health and Safety". With the help of these content lines, ideas about the world such as the existence of a synergistic approach between the living and inanimate world, and the dialogue between nature and man are formed in the minds of students. Younger schoolchildren draw conclusions from the events, changes and relationships they observe in nature and society, acquire the skills to judge, be critical, make predictions, and correctly convey their thoughts and desires to others

The content line "Nature and Us" provides younger schoolchildren with information about the environment we live in, its diversity, and the relationship between nature and humans, and encourages them to engage in research activities in this direction.

In the "Individual and Society" content line of the "Life Science" subject taught in grades I-IV, students get acquainted with the state symbols of the Republic of Azerbaijan, learn the internal discipline of the school in the process of self-organization, which is one of the main concepts of synergy, and obtain certain information about their rights.

The "Individual and Society" content line of the "Life Science" subject

In the "Morale" content line of the "Life Science" subject, taught in grades I-IV, students for the first time systematically form

knowledge and skills on health (physical, mental and reproductive), safety of life activities, protection in emergencies, citizenship, human rights and freedoms, and environmental education, and acquire high moral values such as purity, honesty, conviction, justice, endurance, tolerance, respect for oneself and others

The fourth paragraph of the chapter is entitled "**Possibilities and Implementation of Synergistic Approaches in Technology, Fine Arts, and Music**."The innovations of the 21st century, which entered our history as the century of technology, are distinguished by their rapid development. In terms of a synergistic approach to education, the topics in the subject of "Technology" constitute the majority. The conducted research proves that the subject of technology is of great importance in preparing younger schoolchildren for life. It forms the ability to think independently, creatively, creates the skills to work with a team, and develops the ability to cope with diverse tasks. The subject of Technology, which creates an integrative opportunity, involves students in practical work and gives impetus to the development of visual-practical thinking in them.

In all textbooks of grades I-IV, including "Dessert Fine Arts", there is a real opportunity to base this issue on it and optimal ways to implement it.

As a result of the conducted research, we can say that synergetic is a new field of science that has not been studied until now.

The fourth chapter is entitled "**Implementation of a pedagogical experiment in primary grades: analysis and generalization of the results**." This chapter consists of two paragraphs. The first paragraph is entitled "*Experimental implementation of a synergistic approach in primary grades*."

- The conducted research shows that the synergistic approach to training considers it appropriate to implement the following tasks to solve the problem based on the established principles:

1. Educate primary school teachers on the problem, implement the goals of training based on management technology;

2. Determine the value of the result to be achieved within a specified time, and keep the synergistic approach to education on the agenda, taking into account the developmental function of training;

3. Create conditions for primary school teachers to join the exchange of ideas;

4. Stimulate cooperation between primary school teachers

Although 161 teachers were planned to participate in the experiment at the initial stage, 5 teachers refused to participate in the experiment due to age-related retirement, 3 teachers refused due to serious work commitments, and 2 refused due to illness. Thus, the number of teachers participating in the experiment was reduced to 151.

The experiment was conducted in the primary classes of secondary schools No. 10,163,251 in Baku, Guba city, Hajibala Aliyev secondary schools No. 1, and Samad Vurgun secondary schools No. 2 in Gazakh district. We introduced the teachers to the purpose, organization, and implementation technologies of the experiment. The teachers agreed with satisfaction. 137 teachers were involved in the control group.

To implement this process, our teachers must have a number of competencies:

To implement this process, our teachers must have a number of competencies:

- creative activity to form the worldview of the collective;
- ability to use new technologies in the teaching process;
- attention to the constant improvement of the learning process from a problem perspective;
- constant interest in reviewing, correcting educational programs, their implementation, etc.;
- identification of ways for students to engage in self-education and achieving it, etc.

The use of new approaches by teachers in the educational process is distinguished by the naturalness of educational activity at a low level. Such teachers rely on traditions in the educational process, take the transfer of theoretical knowledge as the basis. They pay little attention to the development of independent, creative thinking skills in students.

The use of new approaches by teachers in the educational process at a medium level involves studying certain pedagogical and

psychological issues related to education and applying them in their activities.

The use of new approaches by teachers in the educational process at a high level involves using the latest technologies in the educational process. It helps students to have qualities such as self-education and self-organization. They instill in them qualities such as working together in a team and systematically mastering knowledge.

Table 4.1.1

In your opinion, how **does the synergetic approach in the teaching of subjects impact the quality of education**

Answers	The numbers of participnts in the survey			
	control	percentage(%)	experimental	percentage(%)
Strengthens collaborative activity;	75	47%	68	45%
Increases cognitive activity;	57	37%	49	32%
Progresses from chaos to order;	34	16%	34	23%
Total	137	100	151	100

The analysis of the responses to the questions showed that the level of use of the synergistic approach in the teaching process of the teachers involved in the study (both in the control and experimental groups) is not very high. The main reason for this is that the synergistic approach is new in the teaching process. Involving teachers in education is a very important issue.

Of those surveyed, 24 people (17.6%) from the control group and 23 people (16.8%) from the experimental group answered “yes” to the question “Is it important for teachers to use the synergistic approach in the teaching process?”

After diagnosing the initial situation, the main issue was related to forecasting and designing. In the second stage of the experiment, we

had to define the goals. What results should we achieve in terms of teachers' use of the synergistic approach in the learning process?
- creation of a systematic-synergistic environment in the learning process;
- formation of joint activities of cooperation between parents-teachers, family-school;
- formation of the use of the opportunities of the synergistic approach in teaching subjects

The theoretical foundations and specific technology of the problem under study were developed. In 2020-2021, the following work was carried out at the creative-transformative (formative) stage:
- implementation of events serving pedagogical enlightenment (lectures for teachers, round tables, trainings, etc.);
- group and individual consultations;
- recommendations for teachers on self-education;

It should also be noted that monitoring the results achieved during a synergistic approach to education and determining the level at which they are developed are very important issues. This has a significant impact on the planning of future work, the development of its methodology, and the elimination of emerging shortcomings.

As a result of our systematic work, it was possible to create experimental and control groups consisting of primary school teachers. Our first task was to diagnose the current situation, conduct a comparative analysis, and identify technologies. .Experience shows that various questionnaires are used to determine the knowledge and experience of teachers regarding the synergistic approach to teaching. The answers we received to the questions we asked the primary school teachers involved in the study allowed us to conclude that it is necessary to study the problem in the classes to which they belong

The synergetic approach to education must first and foremost be well understood by the teacher. Experiments conducted to understand the problem are crucial. However, difficulties arise due to the lack of a complete explanation of the text, the absence of relevant illustrations, and the failure to direct them towards solving the problem in the questions and tasks provided at the end of the textbook to assist the teacher. As noted, the numerous experiments

conducted teach the teacher the essence and importance of the synergetic approach to education.

The second paragraph of the fourth chapter is called *"Organization of experiments on topics held in primary schools*".

The synergistic approach to education allows you to easily reveal the results of the student's activity, the knowledge and skills he has mastered in educational institutions. Because this process requires systematic learning, the elimination of possible chaos in education, the increase in the cognitive activity of students, the formation of their worldview. It was considered expedient to conduct diagnostics that could help determine the traditional organization of education or giving it synergistic content. For this, it is important to conduct diagnostics aimed at revealing abilities and independence of thinking.

The conducted research considers the use of modern methods and technologies as appropriate for studying the problem under investigation. These can be conditionally grouped into three categories:

-Group I are: observations, interviews and discussions, and the determination of results;

-Group II includes: questionnaires, tests, and surveys;

-Group III includes: experiments."

During the research, we consider it is appropriate to use relevant technologies for the application of these methods. To clarify our point, we deemed it appropriate to conduct an experiment in the Azerbaijani language subject for elementary school students.

The text "Eternal Flame" was selected for the experiment in the grade II^{a} at School No. 10, taught by teacher Rasmiyya İsmayılova. The grade II^{b} was chosen as the control group. For the experiment, the synergy of education was ensured, implemented, and optimal methods were identified. To achieve this, it was planned to select the lesson by showing the recording of the eternal flame, which burns continuously at the Martyrs' Lane, and conducting the lesson under its influence. We deemed it appropriate to structure the lesson according to the following plan. Let us review the stages of the lesson.:

Stage I 1)Singing the national anthem of Azerbaijan together with the students;

2) Conducting a survey with the students under the influence of the recording of the Eternal Flame;

3) Showing excerpts from films depicting the January 20 events."

Stage II:4) Creating motivation;5) Explaining the topic;6) Assigning tasks that can engage students in inquiry;7) Conducting a discussion around the topic;8) Summarizing the gathered information;9) Creatively applying the topic – the information;10) Determining the outcome." III mərhələ: şagirdin əməli işi; 11)

Think and solve. Formulate a thought-provoking task related to what they have learned and have them execute it. Reveal the significance of the synergistic organization of education.

Let's consider the quality, efficiency, systemic nature, and the possibilities for self-organization in the context of the pedagogy of synergy: The teacher first played a recording of the national anthem of Azerbaijan (via computer) and sang it together with the students. When the music ended, under the influence of the eternal flame, the teacher instructed Ali to recite the last verse of the "National Anthem ofAzerbaijan.

The conducted research considers it appropriate to use modern methods and technologies in studying the problem under study. They can be conditionally summarized in three groups:

- Methods included in group I - observations, interviews and conversations, determination of their results;
- Group II - questionnaires, tests, surveys
- Group III - experiments.

During the research, guided by these methods, we consider it appropriate to use appropriate technologies for their application.

To clarify our idea, we considered it appropriate to conduct an experiment on the Azerbaijani language subject in primary grades.

During the research, we consider it appropriate to use appropriate technologies for their application, guided by these methods.

To clarify our idea, we considered it appropriate to conduct an experiment on the Azerbaijani language subject in primary grades.

The text “Eternal Torch” taught in the IIa class of teacher Rasmiyya Ismayilova at school No. 10 was determined for the experiment. Class IIb was selected as the control. The optimal ways to ensure and implement the synergy of education were determined for the experiment. For this, it was planned to select a lesson by showing and under the influence of the tape recording of the eternal torch, which is constantly burning in the Alley of Martyrs. We considered it appropriate to build the lesson according to the following plan. Let's look at the stages of conducting the lesson:

Stage I: 1) Sing the anthem of Azerbaijan together with the students; 2) Conduct a survey with the students under the influence of the Eternal Flame tape recording; 3) Show excerpts from films reflecting the events of January 20;

Stage II: 4) Create motivation; 5) Explain the topic; 6) Give a task that can attract students to search; 7) Conduct a discussion around the topic; 8) Summarize the information received; 9) Creatively apply the topic - information; 10) Determine the result obtained;

Stage III: practical work of the student; 11) Think and find. Set up a thought-provoking task related to what they have learned and carry it out. Reveal the importance of synergetic organization of education.Let's look at the synergy of the training in terms of the quality of assimilation, efficiency, systematicity, and self-organization capabilities: The teacher first played the recording of the Azerbaijani anthem (on a computer) and sang it together with the students. When the music ended, the teacher, under the influence of the eternal flame, asked Ali to sing the last verse of the "Azerbaijani Anthem":

M. – How long flame has been burning?

Ş. (X) – Since the war began;

Ş. (İ) – Since the martyrs' sacrifice.

Ş. (Z) – Eve of the War

Ş. (L) – I always see it burning. It is dedicated to the martyrs.

M. – Have you ever been to the Martyrs' Lane?

Ş. (Kollektiv) – Yes.I have been.

M. – On which side does the flame burn ?

Ş. (T) – Next to the graves;

Ş. (Z) – At the entrance to the cemetery;

Ş. (T) – It is burns everywhere, I think;

Ş. (S) – I haven't paid attention.

Ş. (O) I also haven't paid attention;

Ş. (Q) I know there is a torch, but I haven't paid attention;

Then the teacher showed clips from films depicting the January 20 events. He directed the students' attention to that. The teacher proceeded to the second stage of the lesson and created motivation on the topic.

The formulation of the problem for motivation

↓

Questions

Children, where are Martyrs' Lane and the Eternal Flame there located?

↓

Answers

The answers were as follows

↓

Next to the Azerbaijan Television(3 people)	Next to the National Assembly(4 people)	Next to the hotel (1 person)	Next to Highland Park (2 people)

The teacher informed the students that only two people had been able to express their opinion correctly in the response. The teacher then began explaining the topic:Children, listen carefully: Ahmad's grandfather lives in Digah village. This village is located near Baku. Ahmad often visits his grandfather. One day, his grandfather took him for a walk to the nearby hills. They came to the area near Yanardag. There, flames were coming out of the ground. Ahmad asked his grandfather.:

- Grandfather, who has lit this fire?

- Nobody, my child. The gas coming from beneath the ground ignites and burns on its own. Ahmad thought for a moment and said:

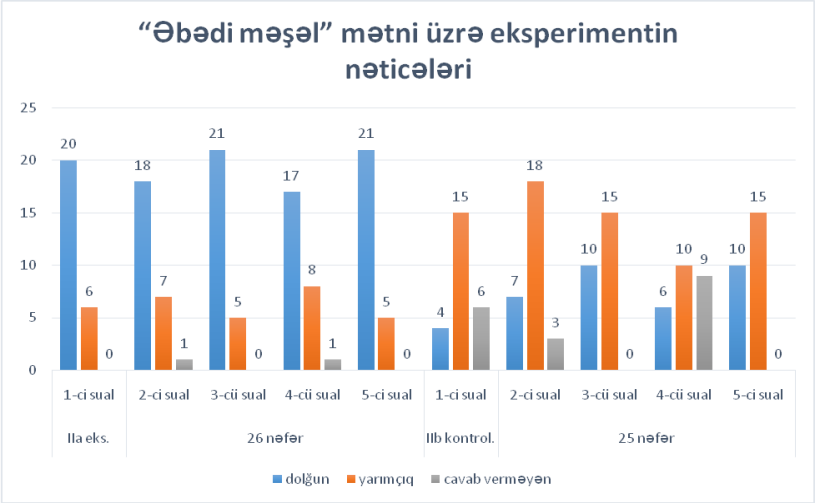
- Grandfather, my father had taken me to the Martyrs' Lane. I saw fire there too. Is gas coming out from there?

No, my son, that flame is lit in memory of those who lost their lives for the homeland. Look, when the gas runs out here, the flame may extinguish. But the 'Eternal Flame' is never allowed to go out by the people. It always burns so that the memory of our heroes remains alive in the nation's consciousness."Then the teacher continuing said

- - Children, Martyrs Alley is located in Highland Park. It was lit on January 20 when the 40th anniversary of those who died was completed and did not go out.

- The teacher directed the students' attention towards inquiry. He instructed them to share what they knew and had heard about those who died in the January 20 events. The students tried to recall what they had heard at home and read at the cemetery. They shared what they remembered. After listening to the students, the teacher summarized the text:

Children, from the text and the information provided by your peers, it can be concluded that the burning flame is eternal; it never goes out and will never go out. Therefore, the martyrs do not die and will never die.



The third stage of the lesson is connected to the second stage. This is because the phase of creative application by the students is related to their practical work. To make the students think, the teacher gives the following task:

1.What is a torch? What is fire? What is flame?

2.Why is Azerbaijan called the Land of Fire?

3.Why do people never allow the Eternal Flame to go out?

4.Where is the homeland?

5.Interpret the phrase "The lands of Azerbaijan are very rich."

Summarizing the lesson, the teacher addressed the students with the following questions: 1.Why are those who die in battle called martyrs?2.What are the similarities between the terms 'Eternal Flame' and 'homeland'?4.How do you interpret the phrase 'Both the underground and the surface are golden'?5When you think of the homeland, what is the first thing that comes to mind?

Interpret the phrase “If the homeland called me son, I would never experience any sorrow.”

The conducted experiment can be considered very successful. Its results can be seen in the table

The outcomes of the experiment show that there are many optimal approaches to the synergistic approach to education. The teacher needs to use them efficiently and purposefully. The results obtained from the topic taught in both the experimental and control classes confirm our view.

The use of thinking-based teaching methods, along with imagination-based teaching methods, not only helps develop the skills and habits of working collectively but also contributes to the reinforcement of acquired knowledge.

The results of the experiment show that there are many optimal approaches to the synergistic approach to education. The teacher must use them efficiently and purposefully. The results obtained from the topic taught in both the experimental and control classes confirm our viewpoint.

By summarizing the findings throughout the research, it is possible to reach the following **conclusion.**

1. The renewal of the content of education, scientific and technological progress, and integration into the world education system require a new approach to training. Therefore, for the successful training process, a synergistic approach is the requirement of the times. The study presents the essence, content, and development history of the concept of synergetic. Synergetic is studied as a new type of scientific worldview, methodology, paradigm, and new scientific direction**.**

2. In accordance with the purpose, object and subject of the research, the specific tasks set and the issues to be solved were studied in the following directions. Research was conducted on the analysis of the current problem of the modern era, its purpose, objectives, principles, and its setting in the pedagogical-psychological literature. Several schools have been formed that contribute to the development of the synergistic approach in the world education system. Great minds, physicists, biologists, chemists, mathematicians, biophysicists, put forward valuable propositions regarding the synergistic approach, and monographs and articles were written. Fundamental research has not been conducted in our republic in the pedagogical aspect. The topic of the dissertation work in Azerbaijani pedagogical science is the first research work.

3. The primary education level in the education system constitutes a system. It is very important to approach the primary education level systematically. A person generally begins to acquire knowledge collectively for the first time in his entire life in primary school. According to the research of psychologists, the period of human life as a researcher coincides with the period up to the age of six. He wants to acquire knowledge about what he sees around him. What he sees around him is in a state of chaos in his brain. It is precisely the elimination of this chaos and the organization of knowledge that takes place in primary school. Self-organization occurs when knowledge changes from chaos to order. The systematic approach considers it important to approach the system from element, structural, functional, integrative, communicative, historical aspects. he element aspect of the primary education level refers to:

-Primary education level classes (I-IV) younger students, their education, upbringing and comprehensive development, taught subjects and subject curricula;

- the structural aspect refers to the interaction of components, that is, the interaction between subject curricula;

- the functional aspect refers to the structure of subject curricula (subject content, teaching strategies and assessment of student achievements);

- the integrative aspect refers to the creation of integrativity between subject curricula;

- the communication aspect reflects both the “horizontal” and “vertical” interactions of subject curricula;

- the historical aspect refers to the history, past and future perspectives of subject curricula.The synergetic approach is a qualitatively new methodological approach to understanding pedagogical processes. The theory of self-organization (synergetics) allows us to look at complex systems and education in a new way. In the educational aspect, self-organization means self-education. The main thing is not the transfer of knowledge, but the acquisition of methods of completion and rapid orientation of knowledge in a branching system of knowledge, methods of self-education.

4. Synergetics helps in solving complex problems that arise as a scientific paradigm, as a worldview, as a theory, and finally as a scientific direction.

5. One of the important features of synergistic systems is their complexity.

A complex system is a system that cannot be accurately described in an analytical or algorithmic form from a mathematical point of view.

- Complex systems are systems whose activities are directed in a certain direction.

- Complex systems are systems whose models lack the necessary information for effective management.

-Complex systems are systems consisting of a large number of interconnected and interacting elements.

- The unique specific feature of complex systems is that, while our knowledge about them is limited, uncertainties constantly increase over time.

6. Education - as a complex system

The main elements of this system, the teacher and the student, are necessary components that interact with each other. The complexity of the mentioned system is determined by the diversity of elements, the type of self-regulation and self-organization. Education in the modern sense is a system. As a complex, self-organizing, open system, it combines a number of subsystems and components. The education system has subsystems that include stages and levels in educational institutions, bodies that manage education, educational programs that take into account the needs and interests of society, cultural and educational organizations, and scientific and research centers that deal with educational problems of students.

7. One of the characteristics of self-organizing synergistic systems, accepted by all researchers, is the requirement for openness. One of the characteristics of self-organizing synergistic systems is openness. Open systems are systems that continuously receive matter, energy, and information from the external environment and maintain their specific state due to this exchange.

Education as an open system

The education system interacts with the social environment by exchanging information, material and human resources, perceives and interprets the processes taking place in society in their changes. The education system can be considered open, because there is a constant exchange of information (knowledge) between the teacher and the student and the process of purposeful acquisition of information.

Openness enables the education system not only to accept new trends coming from the outside by the changed society, but also to meet this external influence with internal needs and the opportunities to change the authoritarian forms of education that have been formed over decades and to manage the educational processThis internal demand plays a decisive role in the development and consolidation of innovative trends in education. In many cases, they are formulated in

various methodologies and programs, new forms of organization of educational activities, which allow not only to respond to changes in society, to prepare the student to live in these changes, but also to provide conditions for the development of the student and the teacher, to reveal the diversity of their capabilities. Thus, education, responding to the diversity of life, has become an internally diverse system, the elements of which ensure the existence of each other and the achievement of a single goal..One of the important features of a synergistic system is its nonlinearity. A nonlinear environment is an environment whose properties depend on the processes occurring in it, and whose behavior is described by nonlinear (two-component and more) equations. Nonlinearity is a concept that permeates everything, exists everywhere, reflects multifaceted and diverse phenomena. One of the stimulating issues of the dynamics of science is its nonlinearity. This has a regulatory capacity both in the time of occurrence of existing processes within the sciences and in the interaction with the environment. Nonlinearity, as a concept that applies to everything, has deep and detailed shades of meaning. It has the ability to manifest itself in every work. Within the framework of synergetics, nonlinearity is connected with the fact that the mutual final efficiency of internal events in science can never be fully determined in advance. Thus, the reason for the final result obtained cannot explain the previous situation. Therefore, a new feature can always appear in science. In this field, unexpected self-organization efficiency emerges and plays a new role as a dominant force in the development of science. Its occurrence is actually not expected, no one can predict it.

However, before this happened in science, research was conducted, certain ideas were put forward. Only after the emergence of synergism did people begin to think: I knew this for a long time. Some scientists were able to show this in their inventions, etc. In the internal processes of science, nonlinearity reduces the predictions made and the pre-existing ones to specific dimensions and frameworks. The role of nonlinearity in the interaction of science with the environment is great. This approach creates a network of

relationships that surrounds it, being exposed to the effects of the environment and at the same time influencing it.

8. Education – as a non-linear system,

The openness of education to society leads to the emergence of innovations in this system, an increase in the degree of internal diversity. This situation forms a number of internal contradictions in the education system. This includes: the contradiction between stability and change is due to the fact that the education system, which is intended to demonstrate cultural patterns, is also conservatism when necessary. As an element of the social system, education cannot but change in connection with changes in social society. The contradiction between unity and diversity. This contradiction is expressed in the need to support pedagogical innovations and at the same time maintain the unity and commonality of requirements for the results of the educational process, the content of education, presented by educational standards. The list of contradictions can be continued, but the peculiarity of the synergistic approach is that these contradictions are understood not as shortcomings, but as internal sources of change and development of the education system. The presence of diverse and mutually exclusive tendencies in the education system makes it sensitive to the influences of society, capable of evolutionary changes.In all forms of interaction with society, the education system retains its characteristics, relative specialization and unity. Therefore, the reaction of the education system to changes in society is not unambiguously determined. Thus, the education system not only reflects changes in society, but also carries out a certain selection of them. Since the education system provides for the future, its changes reflect the potential state of society rather than the actual state. The diversity of potential states expresses the uncertainty of the future, thanks to which the education system has several options for change and is open not only to the present, but also to the future society. The presence of diverse and mutually exclusive tendencies in the education system makes it sensitive to the influences of society, capable of evolutionary changes.In all forms of interaction with society, the education system retains its characteristics, relative

specialization and unity. Therefore, the reaction of the education system to changes in society is not unambiguously determined. Thus, the education system not only reflects changes in society, but also carries out a certain selection of them. Since the education system provides for the future, its changes reflect the potential state of society rather than the actual state. The diversity of potential states expresses the uncertainty of the future, thanks to which the education system has several options for change and is open not only to the present, but also to the future society

9. The main objectives of the methods and principles of the synergistic approach to education were studied to help manage students' cognitive activity and reflection as mechanisms for the development of self-organization.

10. During the study, it can be considered appropriate to program the subjects taught in primary grades in terms of a synergistic approach to the topics in the teaching of the Azerbaijani language, Life Sciences, Mathematics, Technology, Fine Arts and Music.

11. In the research work, synepedagogy (synergetic approach to education) acts as a scientific methodology of self-organization, integration, and a systematic approach.In modern times, the synergistic approach to education helps to make independent decisions, develop creative, logical, and critical thinking in students, joint activity, and the dynamics of educational subjects, and to understand the world as a whole.

12. As a result of the research, it became clear that the modern era keeps the comprehensive development of students on the agenda as a key issue. Thus, in addition to instilling knowledge and skills in them, it also forms a sense of responsibility, attentive listening to adults, independent work, respect for family and love in them.

13. In accordance with the object of the research work, the possibilities and ways of using a synergistic approach to education in primary grades were studied based on examples in the teaching of subjects taught at the primary level. An analysis of teaching methods was conducted in terms of a synergistic approach to education.

14. The questions conducted regarding primary school teachers once again explain the reason why they do not use a synergistic approach in the teaching process because this approach is new in the education system.

15. The learning process in primary grades of general education schools is defined as a complex, nonlinearly developing, self-organizing, bifurcating, chaotic-order relationship, and a set of subsystems, and the synergistic approach is characterized as a methodological principle in them.The pedagogical experiment showed that in order to ensure a synergistic approach to teaching in primary grades, adapting the structure and content of the teaching materials given in the textbooks of the appropriate grades to an improved teaching model that partially meets the conditions of synergy results in the completion of the knowledge acquired by students, the successful application of this knowledge to life situations and practical problem solving, the formation of generalization skills, as well as improving the quality of knowledge and increasing personal responsibility in the lesson.

16. We came to the conclusion that primary school teachers should constantly familiarize themselves with innovations, regularly participate in trainings held in local and foreign countries, and pay special attention to their personal development.

Suggestions

As a result of the research conducted, it is important to keep in mind the following proposals regarding the use of a systematic synergetic approach in primary schools:

1. In the dynamically developing modern era, the educational institution should first of all be equipped with the necessary technical equipment and resources and the implementation of the connection of all educational institutions to a single educational network;

2. The systematic-synergetic approach should consider the goals, content, methods and educational resources (including educational equipment) of education as a whole system in an adequate and complementary manner.

3. Subjects related to synergetic should be included in the curriculum for the specialty of primary school teacher.

4. The ideas of synergetic for education, synergetic in education, and synergetic of education should be realized.

5. In order to further strengthen the integration between the humanities and natural sciences taught in primary schools, a model should be developed in the future. Younger students should be able to study the world as a whole.

6. I propose that specialists in synergetic studies should organize regular authoritative round tables and conferences for modern primary school teachers at the republican level.

7. The new scientific direction of synergetic studies should be taught in the faculties of humanities and natural sciences of higher education institutions.

8. In order to increase the effectiveness of the society-nature-human concept over time, it is advisable to conduct research on self-organizing, complex systems in accordance with the requirements of the time, in the constantly developing science of self-improvement of pedagogy.

The applicant's published scientific works on the subject of the dissertation are as follows:

1. Zamanova, M.Ə. Təhsildə yeni sinergetik yanaşma // Ümümmilli liderimiz Heydər Əliyevin anadan olmasının 95-ci ildönümünə həsr olunmuş "Təhsildə tarixilik və müasirlik", X Ümüm respublika elmi-praktik konfransının materialları,– Bakı: 8 may,– 2018,–206-208 s.

2. Zamanova, M.Ə. Təlimdə sistemli sinergetik nəzəriyyənin əsas inkişaf istiqamətləri / M.Ə.Zamanova. Naxçıvan-NMİ: "Məktəb",– 2019. s. 68-72

3. Zamanova, M.Ə. Sinergetik yanaşmanın pedaqoji-psixoloji ədəbiyyatda qoyuluşu

4. Zamanova, M.Ə. Təlim sistemində harmoniya, sistemogenez, uyğunluq, özünüinkişaf, sinergetizm prinsipləri

5. Заманова, М.А. Синергетика как основа прогностической методологии в современном мире / М.А.Заманова,– Część 4 (Warszawa, Polska) Colloquium-journal, №8 (60),–2020.–c.26-29

6. Заманова, М.А. Синергетические модели образования и их роль в обучении // ....ПЕДАГОГИЧЕСКОЕ ОБРАЗОВАНИЕ: ВЫЗОВЫ XXI ВЕКА Материалы XI Международной научно-практической конференции, посвященной памяти выдающегося ученого – педагога, академика В.А. Сластенина,−Москва,−24 – 25 сентября,−2020.

7. Заманова, М.А. Синергетический подход в обучении азербайджанскому языку в начальных классах.// Перспективные направления развития современной науки 61-я Международная научная конференция,−Москва:−2020,−с.341-344

8. Заманова, М.А. Синергетика образования «Синепедагогика» Modern Humanities Success / М.А.Заманова // Успехи гуманитарных наук,−2022. № 7, -с.251-257

9. Zamanova, M.A, Possibilities of the influence of a “synergistic” approach to various teaching methods in the process of organizing teaching and learning with high school students. //− Revista Conrado,−2022, 18(86),−p. 332-338.

10. Zamanova, M.A, The synergetic approach to the education as an actual problem // Proceedings of the VI International Scientific and Practical Conference Social and Economic Aspects of Education in Modern Society September 20,−2018, Warsaw, Poland,-s.53-57

11. Zamanova, M.A.The basic principles of the synergetic approach to the training // İnternational Journal of Current Research.− 2018, October, Vol. 10, Issue, 10, pp.74425-74427 [http://www.journalcra.com/sites/default/files/issue-pdf/32535.pdf]

The defense will be held on June 13 2025 at 14.^{00} at the meeting of the Dissertation council FD 2.15 of Supreme Attestation Commission under the President of the Republic of Azerbaijan operating at Azerbaijan State Pedagogical University.

Address: AZ 1000, Baku, U. Hajıbəyli street, 68

Dissertation is accessible in the Library-Information Center of the Azerbaijan State Pedagogical University.

Electronic version of the abstract is available on the official website of the Azerbaijan State Pedagogical University.

Abstract was sent to the required addresses on May 13 2025.

Signed for print: 12.05.2025
Paper format: 60×84$^{1/16}$
Volume:: 75380
Number of hard copies: 20