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Synergetic approach platform in organising methodological activity at school

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Abstract

Relevance. The research relevance is determined by the interest of teachers' application of modern innovative education system, and their involvement in the learning process with the help of a diverse and new approach in education.

Purpose. The study aims to investigate the basics of the synergetic method of teaching, and its application in the educational process of the school.

Methodology. The study utilized questionnaires and assessments to explore how the synergetic approach is applied by 36 teachers in Taldykorgan City, Kazakhstan. Methodological approaches included self-assessment, creative potential tests, and a seminar on synergetic education principles, supported by methods like abstraction, analysis, synthesis, and axiomatic reasoning to assess its educational impact.

Results. The results of the study indicate varying levels of engagement and adaptation to the synergetic approach among secondary school teachers in Taldykorgan, Kazakhstan. Younger teachers demonstrated a keen interest in innovation and regularly incorporated new technologies into their teaching practices. Teachers with moderate experience exhibited a strong commitment to professional development through regular self-education activities. However, teachers with extensive experience showed less enthusiasm for adopting innovative practices, preferring traditional curricula. Overall, the implementation of the synergetic approach facilitated collaborative problem-solving and knowledge exchange among teachers, underscoring its potential to enrich educational methodologies and foster a dynamic learning environment.

Conclusions. In conclusion, the study underscores the transformative impact of the synergetic approach on methodological activities within school settings, particularly in enhancing teachers' professional development and fostering innovative educational practices. The findings highlight that integrating synergetics into pedagogical frameworks enhances educators' abilities to navigate complex educational challenges, collaborate effectively, and adapt teaching methodologies to suit diverse learning needs. This research underscores the importance of ongoing support and training in synergetic pedagogy to sustain its benefits in improving educational outcomes and promoting continuous professional growth among teachers.

Keywords: synergetic approach; multivariability; research competence; self-organisation; teacher's professional status; methodological activity.

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Introduction

Modern school today resorts to personal and orientated learning as one of the main aspects of its transformation. Considering the positive aspects of personal and oriented learning, teachers, namely beginners, are mainly oriented to the traditional system of education, using an outdated form – the source of information. There are reasons for all this: the unpreparedness of teachers to work in the conditions of personal and oriented education. Such conditions lead to new requirements in the personality of a teacher, as well as his/her role in the educational process. A teacher in the modern education system of multifunctional level needs to introduce innovative, interactive teaching methods and approaches. One such approach in the teaching system is the synergetic approach [1].

The methodological direction – synergetics, which is reflected in the theory, regularities, and methods of self-organisation of pedagogical norms, is becoming popular. The preferences of synergetics can be attributed to processes and phenomena that arise from the common activity of several different parameters while each of the parameters separately to the common processes do not apply. Synergetics can be regarded as the science of self-organisation, which is defined as the independent complication of the structure, or form of a single system with a smooth and slow change in its characteristics. Often synergetics are used as a science of unexpected processes and phenomena, as any qualitative change in the structure of the system leads to an unexpected impression. The study of the cause of the unexpected phenomenon is the subject of synergetics. The mathematical apparatus used in the system of synergetics is called the theory of dynamical systems. The synergetic approach is implemented in the school to create an effective and harmonious educational environment where teachers develop and reach their potential.

The synergetic aspect of the education process is the formation of such conditions, where there is an opportunity for the teacher to self-learn, to be actively involved in the creative process. Employing joint efforts of the teacher and the student, interactive functioning in one rhythm occurs, where both the teacher and the student are mutually enriched and mutually learnt. Self-activity in pedagogical practice is an opportunity for interaction between teachers and an exchange of experience, which fully reflects the functioning of the pedagogical system, providing an understanding of the development of the pedagogical process. Synergetic, alternative, non-linear thinking is not an easy task for a teacher, assuming the possibility of changing events and transitions in complex systems. The teacher, choosing a more acceptable path, is guided by personal values and preferences, which are determined by the internal qualities of a complex education system.

According to A. Kozhahmetova [2], synergetics is an interdisciplinary direction in science, which studies the universal regularities of processes and phenomena in complex unequal systems, based on the principles of self-organisation. The content of the synergetic approach in education is considered a procedure of self-organisation aimed at self-development, self-education, and self-education of the teacher's personality. N. Tormanov et al.

note that synergetics perform the function of implementation of human behaviour and its tracking of purposeful activity, this function in the course of learning shows parallels between different phenomena [3]. G.I. Biisova and Zh.K. Madalieva argue [4] that the pedagogical process in synergetic plans provides much more opportunities for self-education of the teacher than in the usual training curricula.

Sh. Taubayeva [5], based on the findings in his study, states that the synergetic approach is a priority link that should characterise the science of the future, it justifies the existing trajectories of individuality self-education and self-development. Kazakhstan researcher S. Zholamanovna [6] believes that the synergetic approach can be used to consider the process of education, which proceeds ambiguously and is built on non-direct cause-and-effect relationships, caused by a variety of external and internal influencing factors: random or regular, predictable, or spontaneous, both ordered and chaotic. Synergetics involves the openness of the educational system and pedagogy, the use of information technologies, and the integration of humanitarian and natural knowledge [7]. The application of a synergetic approach in the educational process of schools will give an impetus to the self-development of teachers and, the development of social and intellectual capital of the nation. In this regard, the country's education programmes revise curricula and subject standards to include the synergetic approach in teaching.

Modern science devotes insufficient attention to the study of topics on pedagogical synergetics. All of the above motivates researchers to search for new methods of studying the synergetic approach in education, and the possibilities of free and purposeful application of information in the professional activity of a teacher. The study aims to investigate the platform of education using the synergetic approach of methodological activity of the school. To achieve the goal, the research objectives were formulated. In particular, define the concepts of "synergetics", "synergetic approach", and principles of synergetic approach in education. And also, description of advantages and limitations in applying the synergetic approach in school.

Materials and Methods

An experiment on the use of a synergetic approach in the educational environment by teachers was carried out with teachers at secondary schools in Taldykorgan City. The experiment was conducted to determine the self-esteem, creative potential, and self-education of teachers in Kazakhstan. Participants of the process – teachers in the number of 36 people from different educational institutions in Taldykorgan city (Table 1).

Table 1. Demographic characteristics of the study participants

Amount		36
Age		24-46
Gender	Female	22
	Male	14
Work experience	Up to 5 years	4

	Up to 10 years	21
	More than 15 years	9

Source: compiled by the authors.

Using questionnaires in scientific work, the application of the synergetic approach in the learning process by teachers, the degree of expression of knowledge, skills and abilities, and personal qualities were studied. The evaluation was carried out according to the method “Self-assessment of activity and culture of a teacher”. Six basic questions were set. The answer options were offered: yes/no/sometimes:

1. Do You use innovation in teaching?
2. Are you improving Your professional performance?
3. Do You share Your experience with colleagues?
4. Do You have a preference for a standard curriculum?
5. Are You engaged in self-development?
6. What is Your self-esteem? (Answers: yes – high, no – adequate, sometimes – low).

According to the survey result analysis, young teachers with work experience of up to 5 years (22%) are eager to innovations and application of new technologies in the teaching process, teachers with work experience up to 10 years (53%) – develop and improve their professional activity, constantly improve, self-develop, share experience with colleagues, and teachers with the highest work experience, more than 15 years (25%) have a high level of knowledge, but have little interest in the application of innovations in teaching, tend to the standard traditional curriculum.

The study also included a “Creative potential” test, where the level of development of individual qualities and creative potential of the teacher was determined. The final event was a scientific seminar for teachers on the topic: “Synergetic Approach in Teaching”, where the concepts of “synergetics”, “self-organisation”, and “self-education” and their application in the learning process at school were discussed. The seminar included a curriculum of synergetic education dedicated to history, geography, physics, culture of society, English language lessons, as well as implementation of the synergetic approach in teaching starting from primary school.

The main objective of the experiment was to improve the organisation of methodological work in the school based on the self-organisation of all participants of the learning process. It aimed to improve the spiritual outlook, moral and intellectual development of the teacher, and the socialisation of the personality. Another goal was to develop a comprehensive plan for the introduction of the principles of self-organisation in teaching. The experiment also aimed to form non-linear thinking in teachers and enhance their ability to work independently with information. Additionally, it sought to monitor the development of the educational environment using mathematical methods. Lastly, the experiment aimed to develop a methodological approach to the synergetic approach in the education system and identify its principles of application in education. The abstraction method was used to study the object of research of the synergetic

approach in the educational system and to identify its principles of application in education.

The analysis method was used to study the experience of other countries of the world in the issue of researching synergetics in the educational process. This method was used to study theoretical materials on the topic of scientific research, to study the conclusions of the paper, and to study the results of the questionnaire, where the impact of the synergetic approach on teaching at school was determined. The synthesis method was used to identify the main ways and forms of application of the synergetic approach in the educational process. The axiomatic method was used to define the role and application of synergetics in education.

Results

The concept of “synergetics” denotes a combination of action and joint activity. The subject of synergetics is the mechanisms of self-organisation. From this comes the name of the theory of self-organisation. Synergetics means alternativeness or multivariability of choice. To organise the process of any activity, the synergetic approach requires non-linearity and prediction of results [8].

The synergetic approach encompasses the entire education system and learning process, going beyond a single lesson in an educational institution. This approach simplifies the educational process, giving educators choice and mobility. The synergetic method involves learning from and with others. However, the implementation of synergetic methods in the learning process is a labour-intensive process, but the synergetic approach can exist with other interactive methods of education. Especially, the correlation of the synergetic approach with the traditional approach. It complements the traditional form of education. The synergetic approach is based on the dominance of self-management, self-education, and self-organisation in learning activities, and is embodied in the inducing or stimulating action on the subject with the aim of its self-improvement and self-disclosure, self-actualisation in the course of work with other people and with itself.

The basis of this approach is determined by the understanding that non-linear, non-equal systems are capable of self-organisation, and chaos and disorder sooner or later become an ordered system. Such chaotic actions in the system create opportunities for self-organisation, and the system is supplemented with new elements. Synergetics determines the effectiveness of chaos, the fight against which leads to order. The interdisciplinarity of synergetics and its positive nature determine its important role in the system of education today. Education, which is built on the synergetic approach, effectively corresponds to the values of comprehensive development of the personality and methods of continuous self-organisation, which in learning means self-education. Self-organization or synergetic approach is the consequence of a new non-linear dialogue of man with nature, which leads to a dialogue of a teacher with himself and with his colleagues. This non-linear situation is connected with the possibility of choice and uncertainty. When choosing the future, the teacher is guided by a personal complex system development course, as well as by personal values and preferences [9].

A synergetic approach in pedagogy is based on the principles by which the teacher works in a favourable educational environment. They enable the formation of an active and independent personality of a teacher who would be ready for a complex educational process (Table 2).

Table 2. Basic principles of the synergetic approach in pedagogy

Principle	Peculiarity
Interrelationship and interaction	All components of the education system are interconnected, interact, and influence each other, which together group the education process. It is worth considering their combined efforts and harmonising all the components.
Non-linearity and uncertainty	The educational process can be volatile and uncertain, not necessarily predictable, and linear. The teacher needs to react to unexpected situations smoothly and flexibly. It is necessary to adapt to all changes, and situations, and look for innovations in problem-solving.
Self-development and self-organisation	Self-development and self-organisation. The teacher needs to create conditions for self-development.
Cooperation and communication	Co-operation between teachers. The teacher's task is to co-operate with colleagues, to communicate, to conduct group activities, to participate in seminars and round tables to share experiences. It is worth trying to develop skills and skills of teamwork, respect and listening to the opinions of others.
Creativity and innovation	A favourable environment for creative thinking and innovation. The teacher strives for experimentation and creativity, seeks new ideas and ways of solutions, and creates such conditions where individuality and creative potential will be exercised.

Source: [10].

The synergetic approach in the methodological activity of the school is used in different aspects of the teaching process. It creates ideal conditions for more effective development and self-learning of teachers. For example, the organisation of teamwork (in addition to individual activity on the curricula, the teacher organises group projects, discussions and assignments), which provides an opportunity for teamwork, ideas and experience exchanging with colleagues, learning and developing skills and abilities to collectively solve questions and assignments, as well as the use of interactive methods in teaching (projects, games, experiments) to stimulate interest and involvement of their students in the learning process.

Individualisation of learning includes the peculiarities of each teacher, along with appropriate material, the interests of each student in the class for successful learning, and the development of creative thinking that provides the teacher with the opportunity to stimulate students to look for new ideas and ways of solutions, experiment to show their individuality and manifest their creative potential. Interactive teaching methods are the most effective and creative way of teaching, where a fantastic virtual space for creativity in a safe atmosphere is created. This approach has a positive impact on the development of the schoolchild's personality and allows the teacher to think creatively, as well as teaches how to define goals, predict results, conscious choices of individual professional activity. The synergetic approach considers each element of the educational process as an independently existing subsystem, where there is an opportunity for the teacher to improve intellectually, socially, and emotionally. Therefore, it is possible to state, that the synergetic approach in pedagogy has several advantages. Firstly, it is the active participation of the teacher in the learning process, independent research, and presentation of new material. Secondly, it is the development of creative non-standard thinking, experiments, and new ideas. Thirdly, it is cooperation and communication in the classroom, exchange of ideas and knowledge, and joint results in the learning process.

The results of the synergetic approach in pedagogy consist of the structure and goals of education; a new theory of choosing the meaning of learning, new technologies in learning, and synergetic content of pedagogical process management. However, it is worth noting that the synergetic approach has limitations in application. As more teacher time is spent on preparing and delivering lessons than in the traditional approach, which can be difficult in the context of a limited lesson. Teachers should allocate additional time for planning and organising interactive lessons. The synergetic approach is an individual approach to each teacher, which may be difficult with many participants in the process. The synergetic approach may present some difficulties for the teacher when monitoring students' progress. Teachers should develop alternative assessment methods that consider the individual achievements and progress of each student.

A synergetic approach in the learning process contributes to the increase of the educational environment of functional and structural diversity, which implies a transition from the traditional educational system, which is based on limited regulation of actions to self-organisation; formation of such technologies, which would be comparable to a variety of pedagogical approaches; creation of individual blocks from the system of educational subjects, choice of appropriate time, pace of learning; self-regulation and positive self-assessment of the teacher's actions. The synergetic approach provides an opportunity to define objectively and anew the core of the content and structure of pedagogical activity. The expected main objectives of innovation activities with the application of a synergetic approach in school methodology are the implementation of the strategy of education where different educational systems can be used, the creation of conditions for the development of

adaptation principles of a teacher's activity in a rapidly developing information society; creation of a holistic system of education to ensure the successful orientation of teachers in existing situations, development of self-actualisation and their abilities; development of personality-oriented qualities and education of pupils using information technologies; integration of the school not only in the society of the country but also beyond its borders.

Within the study, an experiment was conducted to determine the self-esteem, creative potential, and self-education of teachers in Kazakhstan. The experiment involved 36 teachers from different educational institutions of Taldykorgan city. The experiment was

conducted to determine the application of a synergetic approach in the methodological activity of the school. To study the issue of the application of a synergetic approach in the learning process by teachers, the degree of expression of knowledge, skills and abilities, and personal qualities in the learning process, a questionnaire survey was conducted to determine the self-assessment, creative potential, as well as self-education of teachers in Taldykorgan city. The questioning was conducted on the topic "Self-assessment of activity and culture of a teacher". Six main questions were set. The answer options were yes, no, sometimes (Figure 1).

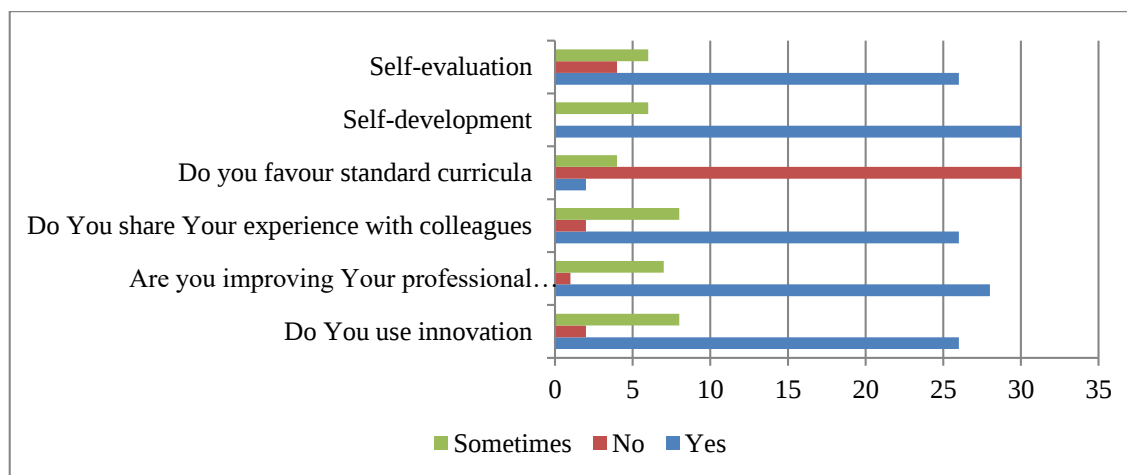


Figure 1. Self-evaluation of educator's performance and culture

Following the analysis of teachers' answers, Figure 1 shows that young teachers with up to 5 years of work experience (22%) are eager to innovate and apply new technologies in the teaching process; teachers with up to 10 years of work experience (53%) develop and improve their professional activity, constantly improve, self-develop, share experience with colleagues; and teachers with the most experience, more than 15 years (25%) have a high level of knowledge, but are not interested in applying innovations in teaching, tend to the standard traditional curriculum.

At the beginning and after the work was also carried out testing "Creative potential", where the level of development of individual qualities and creative potential of the teacher was determined on a scale from 1 to 10. Such qualities of a teacher were determined: belief in oneself, boundaries of curiosity, constancy of actions, ambition, auditory and visual memory, independence of actions, abstraction, and level of concentration (Figure 2).

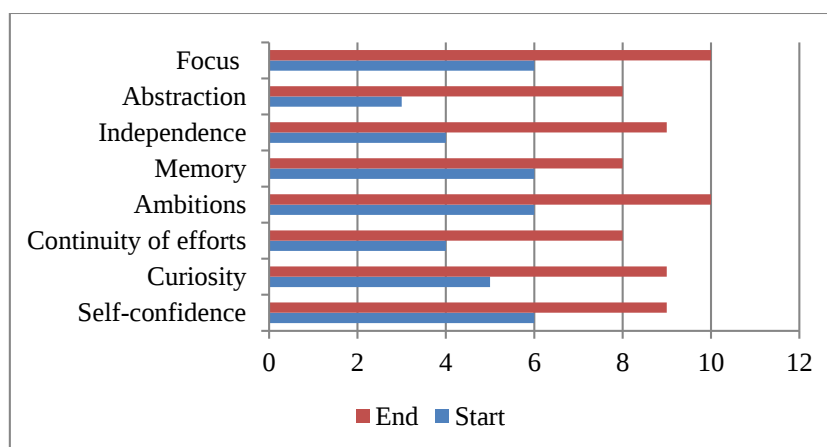


Figure 2. The creative potential of a teacher

Teacher's self-esteem was also evaluated Figure 3 shows that some teachers' self-esteem has stabilised to adequate and has increased from lower.

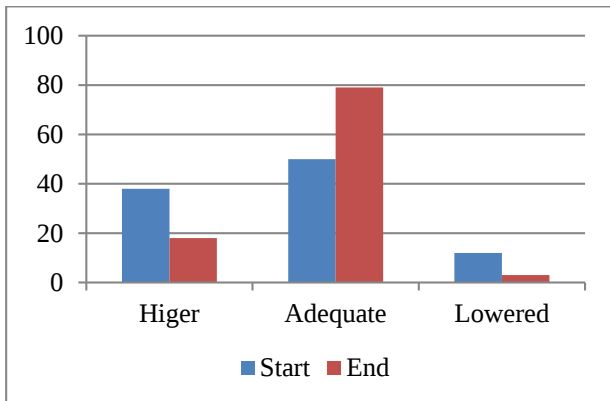


Figure 3. Teacher's self-esteem

The survey on self-education revealed the results that young specialists are those who are constantly improving themselves and raising the level of their skills (Figure 4). More than half of teachers are engaged in self-education every week, and only 6 respondents allocate one or two hours a month for self-development. All this makes up the general level of creative potential of an individual.

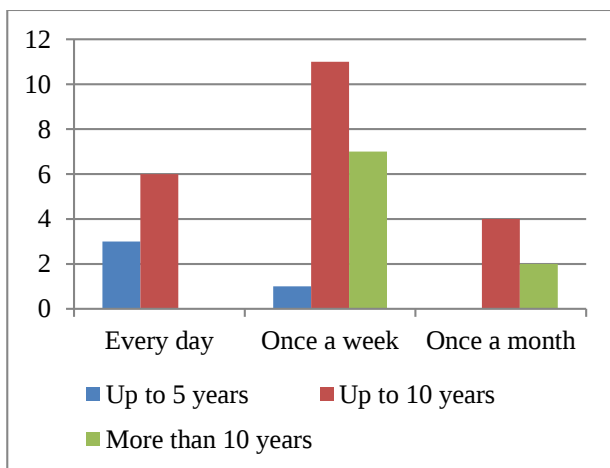


Figure 4. Teacher's self-improvement

Based on the results of the completed surveys, a curriculum was developed that would adjust all components of school teachers' professional skills quality. The curriculum aims to introduce and improve teachers' self-education and self-development skills. The priority details of the curriculum are motivation, independent problem-solving in teaching and education of schoolchildren, scientific and research activities of teachers, creative potential, a course on the development of methodical activities and professional skills of teachers. Teachers were engaged in the curriculum for six months, outside school hours, while devoting time to preparation for teaching lessons at school.

According to the results of the curriculum, the following was implemented. Within the framework of self-education, the study of methodological literature, scientific collections, and articles was conducted. The plan of activities for teachers included the teacher's report on self-

development and self-education. This included attendance of seminars, conferences, and round tables, as well as speeches at pedagogical councils. Additionally, it involved the creation and presentation of a personal portfolio and the writing of scientific articles within the framework of the educational institution. Teachers also participated in scientific and educational events of the city. They attended city conferences, seminars, master classes.

The curriculum results include the development of individual plans for teachers applying the synergetic approach to teaching. The final stage of the curriculum was a scientific seminar for teachers on the topic: "Synergetic approach in teaching", where the concepts of "synergetics" and "self-organisation" were discussed, as well as their application in the educational process. The seminar included a synergetic education curriculum dedicated to the history, geography, physics, culture of society, English language lessons, as well as implementation of the synergetic approach in primary school teaching.

Application of the approach in the management of the learning process in schools, synergetic approaches in project activities of students and teachers. The productivity of this seminar was determined by the understanding of the ideas and methods of synergetics by the teaching staff and school administration. The experiment provided an opportunity to improve the level of teacher's professional qualities (Figure 5).

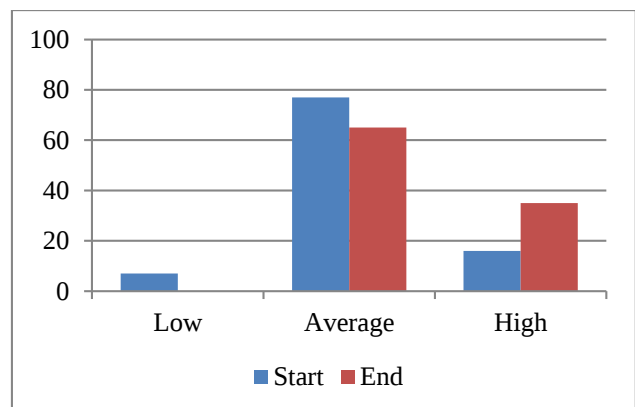


Figure 5. Level of teacher's professional qualities before and after the experiment

Figure 5 shows the level of development of individual qualities of teachers at the beginning of the experiment: high – 16%, average – 77%, low – 7%. The average level of teachers' potential development is leading. At the end of the experiment, there is an increase of high level up to 35%, low level is absent, average level accordingly decreases to 65%. Despite the results, the average level is considered normal, teachers have qualities due to which they have an opportunity to create, self-development, and self-learning. High shows the level of opportunities, and access to a variety of forms of creativity.

In summary, it is possible to conclude that the synergetic approach in teaching is a dynamically developed, complex and multilevel process. It is closely intertwined with the teacher's activity: development of creative potential, self-assessment, methodological culture, and self-education [11]. Applying the synergetic method in teaching, the teacher realises humanistic ideas

and anthropological approaches, harmoniously balancing between the humanitarian and natural science worldview of the child. This approach renews the professional activity of the teacher, thus helping and enriching the educational process with dialogue methods of pedagogical interaction and improving the quality of education. A synergetic approach in education and teacher activity opens new opportunities and prospects for personal development.

Discussion

Synergetic pedagogy assumes the synergy of the educational process, the formation of a teacher's personality and the accumulation of knowledge. Nowadays the goal is not only to form a unified methodology of education but also to teach teachers to consciously form their methodology and style of education, inherent only to them, while remaining in the positions of human science. M.P. Lu et al. [12] believe that to successfully apply the synergy approach ideas in education, it is necessary to create a system of knowledge on the theory of self-organisation in education, which would include concepts and phenomena from the curriculum with synergetic content. Italian researchers evaluated the effectiveness of the synergetic approach in teaching, where the results showed that the level of learning of graduate students in a Spanish-speaking institution increased and that the synergetic approach proved to be an effective teaching method.

In the educational system, multivariability is determined by the creation of such conditions so that the teacher could have the right to choose, as well as providing a chance for independent movement towards success, making adequate independent decisions, and ensuring the development of an alternative path. That is, this choice should consist in the possibility to find an individual trajectory of teaching, the pace of education, to choose independently the type of lessons, disciplines, methods and forms of teaching, individual programmes and methods, creative tasks. The theory of American researchers B. Edwards and S. Higa [13], which states that the true process of self-organisation is the spontaneous emergence and sustainable activity in the shown non-equilibrium systems of innovative structures, is noteworthy. Self-organisation in pedagogy implies the presence of interactions between teacher and student, which are the requirements of the pedagogical system development and the mechanism of pedagogical process development.

However, for instance, Bulgarian researchers in the field of innovative technologies in education B. Balogová et al. [14] believe that the synergetic approach is over-promoted to improve the literacy and research skills of teachers, as the experience of Bulgaria shows – not enough research has been conducted on these topics, which would show the impact on the achievements of teachers in the learning process. It should be clarified that in any case, the innovative synergetic concept contributes to a deep knowledge of non-linear, complex, progressive open systems such as education, and the ability to solve complex problems in the education system, which is based on infinite perspectives, is a cognisable process.

Synergetics in education, which is applied to the study of the learning process, and formation of personality and knowledge, is based on synergetic principles, formed on a

wide range of human sciences; it refers not just to the system approach to education, but also to the consideration of the mechanisms and dynamics of self-organisation of the participants of the educational process, education management. Lithuanian doctors of pedagogical sciences K. Pyragas and A. Borodinienė [15] state that, following the ideas of the synergetic paradigm, interaction is not a linear transfer of material or information, but a constant, omnidirectional formation in a certain state. A person, events, and things are in a constant relationship. Researchers believe that in education it is necessary to boldly abandon aggressive influence in favour of applying the pedagogy of linear interaction. The opinion of the researchers is valid, as the synergetic approach in education is an important way to fully convey meaningful information rather than fixating on a single moment.

Studying the educational systems of today and the synergetic climate of schools, S. Atik et al. [16] stated that synergetic climate is one of the key factors through which organisational continuity and the action of strong interpersonal relationships. They studied the relationship between the synergistic climate of schools and organisational attractiveness as perceived by teachers and concluded that there is a strong positive correlation between the subjects. Furthermore, the results of the study showed a 59% difference between synergistic climate and organisational attractiveness. Indeed, the synergistic environment is created by cooperation, learning and exchange between colleagues, which undoubtedly contributes to the development of teacher culture and continuous learning in schools.

The pedagogical process of schools of innovative type should be aimed at the formation and development of the applicant's abilities, and capabilities to meet the challenges of the information society and self-realisation in the volatile conditions of the modern world. The key aspects of self-development in education are considered to be the ability for personal growth, self-determination, self-regulation, self-expression, and self-realisation, which in the end will allow forming the teaching experience of each teacher, the ability to implement their life purpose. The opinion of Ukrainian researchers, H. Tereshchuk and N. Lupak [17], that self-identification and self-determination as a complex integrative fact covers individual, spiritual and social spheres of personality, develops throughout life and is formed under the influence of social, psychological, and spiritual factors, and also consists in supporting a person's constant self-development and creation of unique self.

Chinese educational systems researchers P. Guo and Q. Yin [18] believe that the main difficulties of introducing synergetic fundamentals into the content of secondary school subjects are the lack of educational technologies and current methodology of teaching synergetics, as well as the corresponding concept, the limited amount of teaching time at school, the unified nature of the content of the theory of self-organisation. It is reasonable to agree with the arguments of scientists and add that for successful use of the synergetic approach in the process of teaching at school it is necessary to develop a system of knowledge from the theory of self-organisation for teachers.

According to Kazakhstani researchers-pedagogues A. Kozhanova et al. [19], the new approach in teaching can be

used to implement a universal method for solving controversial issues between cultures and can create a new picture of the world, where a person is socially adapted. To date, synergetics is the only discipline that combines in its description the processes studied by humanitarian and natural disciplines. It is also worth adding to the opinion of researchers that a person capable of thinking synergetically has the gift of prediction, following the non-linear nature of the development of the socio-natural world, can show the possible trajectories of its evolution, as well as anticipate and prevent the manifestation of undesirable events, which means to have the gift of anticipation of activity.

The Singapore experience shows that a synergistic and sustainable approach enables schools to provide authentic learning skills and develop youth leaders in the community. D.G. Sawlani and W.C. Jianming [20], at a regional conference on service learning, outlined techniques for successful use of the synergistic approach: development of a result achievement project; identification of the complex structures order characteristics and spectrum of goals; identification of influences that can bring the teacher to the desired level; creation of a temporal world; creation of “on the edge of chaos” circumstances; creation of a creative process organisation; achieving emergent or equifinality, which is a creative workshop at the school; and creation of a creative workshop at the school. The recommendations on methodological techniques of the researchers should be considered while adding that the synergetic approach should be introduced from primary school onwards. Developed non-linear way of thinking will enable teachers to create the real world for schoolchildren, to solve complex problems of everyday life, economics, ecology, and politics.

In summary, it is possible to state that the results obtained in the course of this work, as well as the examined robots of researchers from different countries of the world, provided an opportunity to explore the platform of a synergetic approach in the methodological efforts.

Conclusions

This study was conducted to explore the platform of a synergetic approach in the organisation of methodological work at school. It should be concluded that the application of the synergetic approach in teaching enables teachers to be independent in solving tasks, to understand non-linear, complex, and open systems (education, self-education, upbringing), and to develop critical thinking skills along with the interdisciplinary nature of education. Thus, the synergetic approach, reveals scientific and pedagogical knowledge in a new way and shows orientation to the multicomponent, variability and alternativeness of the studied processes. Synergetics in education include known traditional approaches. Nevertheless, it is a new approach to the development of scientific and pedagogical knowledge.

References

- [1] Wu M, Sarker NI. Assessment of multiple subjects synergetic governance in vocational education. *Front Psych.* 2022;13:947665.
- [2] Kozhahmetova A. Synergetic paradigm in linguistics. *Tiltany.* 2022;88(4):41-50.

The study defined the concept of synergetics, the definition of the synergetic approach in the education system, the basic principles and their application in pedagogical practice, and the advantages of its application. The experiment was conducted with 36 teachers of secondary schools in Taldykorgan city to determine the use of the synergetic approach by teachers in the educational environment, as well as self-assessment, creative potential, and self-education of teachers who apply the synergetic approach. The results demonstrated that young specialists strive for innovations and application of new technologies in the teaching process, while teachers with a long work experience develop and improve their professional activity, improve, self-develop, and share experience with colleagues, and a quarter of respondents have a high level of knowledge but have little interest in applying innovations in teaching, adhere to the standard traditional teaching programme.

A scientific seminar for teachers on the topic “Synergetic approach in teaching”, demonstrated the productivity of the seminar, which was determined by the understanding of the ideas and methods of synergetics by the teaching staff and school administration. The priority goals of the experiment were the improvement of the spiritual outlook, moral and intellectual development of teachers; improvement of methodological work organisation in the school based on self-organisation of all participants of the learning process; development of a comprehensive plan for the introduction of self-organisation principles in teaching; formation of teachers’ non-linear thinking, independent information processing skills.

The practical value of this study is determined by the contribution to the development and study of methods of innovations in education and the difficulties of their implementation. The obtained conclusions and the main provisions of the reviewed material can be used by teachers in preparation for classes on innovative technologies, as well as in the course of teaching and studying such disciplines as “Synergetics”. The material presented can also be used by students specialising in education, interested in the issues of innovative technologies in teaching, and synergetic pedagogy.

Further studies should address the study of opportunities, and the use of new and improved methods of synergetic approach in educational institutions. Furthermore, more detailed consideration should be given to the issues of interest of Astana school management in the use of a synergetic approach in the education process.

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N/A.

Conflict of Interest

None.

- [3] Tormanov N, Bakirova A, Manakbaeva U. Studying the specifics of distance education using a synergetic approach to learning. *Bull Al-Farabi Kazakh Nat Univ Ser Ped Sci*. 2021;66(1):159-169.
- [4] Biisova GI, Madalieva ZhK. Synergetic approach in pedagogy: Problems and opportunities. *Bull Abai Kazakh Nat Ped Univ Ser Ped Sci*. 2020;66(2):19-24.
- [5] Taubayeva Sh. Synergetic approach in pedagogy as a platform for studying the phenomenon of personal self-development. *Ped Psych*. 2020;4(45):5-14.
- [6] Zholamanovna S. The concept of education in the system of continuing education of the Republic of Kazakhstan. *KSTU J*. 2020;6(2):1-15.
- [7] Sever N, Atik S. Examining the relationship between the leadership styles of school principals and the organizational attractiveness of schools. *İnönü Univ J Ed*. 2021;22(1):772-808.
- [8] Harrison G. Synergetics as a scientific paradigm. *ScienceForming J*. 2023;15(4):210-220.
- [9] Jafarov S. Synergetic and innovative approaches to education. *Rev Invest Univ Quind*. 2023;35(1):415-430.
- [10] Guerrettaz AM, Grandon M, Lee S, Mathieu C, Berwick A, Murray A, Pourhaji M. Materials use and development: Synergetic processes and research prospects. *Folio*. 2018;18(2):37-44.
- [11] Abdullaeva B. General principles of synergetics as a new scientific paradigm. *Orient Ren Innov Ed Nat Soc Sci*. 2023;3(3):767-770.
- [12] Lu MP, Ward HC, Overton T, Shin Y. The synergetic approach to effective teachers' research education: An innovative initiative for building educational research capacity in a Hispanic-serving institution. *J Hisp High Ed*. 2014;13(4):269-284.
- [13] Edwards B, Higa S. The global education policy of school-based management in conflict-affected contexts: Current reach, prominent rationales, and future research. *Sage J*. 2017;16(3):306-320.
- [14] Balogová B, Ješková Z, Hančová M, Kireš M. Effect of synergetic implementation of inquiry activities across three subjects in comparison to more traditional approach to teaching. *AIP Conf Proc*. 2017;1804:050001.
- [15] Pyragas K, Borodinienė A. Some synergetic aspects of education. *Pedagogika*. 2014;113(1):211-228.
- [16] Atik S, Erdoğan U, Çağırman M. Examining the relationship between the synergetic climate and the organizational attractiveness of schools. *E-Int J Ed Res*. 2023;14(4):17-32.
- [17] Tereshchuk H, Lupak N. Self-development of education seekers in the context of synergetic approach and post-neoclassical educational paradigm. *Sci Iss Ternopil Volodymyr Hnatiuk Nat Ped Univ Ser Ped*. 2022;1(2):13-20.
- [18] Guo P, Yin Q. Synergetic learning systems: Concept, architecture and algorithms. *ArXiv*. 2020;6(1):1-20.
- [19] Kozhanova A, Khamzina Sh, Klimenko M, Tarasovskaya N. Experimental work as one aspect of the environmental education activities for rural schools in Republic of Kazakhstan. *E3S Web Conf*. 2023;413:03036.
- [20] Sawlani DG, Jianming WC. A synergistic, sustainable approach in Service-Learning: School Community-Corporate Partnership. *SUSS J*. 2019;61(3):1-15.

Платформа синергетичного підходу в організації методичної діяльності в школі

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Анотація

Актуальність. Актуальність дослідження визначається інтересом вчителів до застосування сучасної інноваційної системи освіти та їхньою включеністю у навчальний процес за допомогою різноманітного та новаторського підходу у навчанні.

Мета. Метою дослідження є вивчення основ синергетичного методу навчання та його застосування в освітньому процесі школи.

Методологія. Дослідження використовувало анкетування та оцінки для вивчення того, як синергетичний підхід застосовується 36 вчителями у місті Талдикорган, Казахстан. Методичні підходи включали самооцінку, тести на творчий потенціал та семінар з принципів синергетичної освіти, підтримані методами абстракції, аналізу, синтезу та аксіоматичного мислення для оцінки їхнього освітнього впливу.

Результати. Результати дослідження показують різні рівні залученості та адаптації до синергетичного підходу серед вчителів загальноосвітніх шкіл у Талдикоргані, Казахстан. Молодші вчителі демонструють живий інтерес до інновацій та регулярно впроваджують нові технології у свої практики. Вчителі з помірним досвідом виявляють сильне прагнення до професійного зростання через регулярну самоосвіту. Однак вчителі з великим досвідом менше зацікавлені у впровадженні інноваційних практик, віддаючи перевагу традиційним програмам. Загалом, впровадження синергетичного підходу сприяло колективному вирішенню проблем та обміну знаннями серед вчителів, підкреслюючи його потенціал для збагачення освітніх методик і створення динамічного навчального середовища.

Висновки. У висновку дослідження підкреслюється трансформаційний вплив синергетичного підходу на методичну діяльність в шкільному середовищі, особливо в покращенні професійного розвитку вчителів і сприянні інноваційним освітнім практикам. Знайомство з синергетикою в рамках педагогічних кадрів покращує можливості педагогів вирішувати складні освітні завдання, ефективно співпрацювати та адаптувати методи навчання до різноманітних потреб учнів. Це дослідження підкреслює важливість постійної підтримки та навчання у синергетичній педагогіці для збереження її переваг у покращенні освітніх результатів та підтримання постійного професійного росту вчителів.

Ключові слова: синергетичний підхід; багатоваріативність; дослідницька компетентність; самоорганізація; професійний статус вчителя; методична діяльність.