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SYNERGETIC SIMULATION OF MANAGING PROCESSES IN EDUCATIONAL SPHERE IN THE CONTEST OF TEMPORARY SELF-RULED MANAGERIAL TARGET TEAMS APPLICATION

ABSTRACT

Considering the spreading of the system and synergetics methodology in the sphere of modern science, it is particularly important to apply the main principles of synergetics methodology in the process of educational management. The purpose of this application is to conduct a synergetic simulation of the managing processes in the educational sphere with the result of building a comprehensive synergetic model of such a process. The research has been conducted on three methodological levels: 1) the general one covering the fundamental principles of synergetics, 2) the peculiar one covering the fundamental principles of synergetics realized in the sphere of educational management, 3) and the single one covering the synergetic principles realized in the sphere of educational management when these principles have been extrapolated on the concrete synergetic model of educational management. It is stated that the system and synergetics view of the world reveals certain fundamental aspects of the behavior of natural and educational systems in the context of their control and governance. The conducted analysis enables us to state that educational management can be effectively carried out by means of temporary self-ruled managerial target teams. The members of the teams can be recruited both from different state and public structures and from educational institutions with the aim to solve concrete educational problems. These stem from current social events expressing certain social demands. The application of temporary self-ruled managerial target teams is realized according to fundamental synergetic principles and phenomena. By using temporary self-ruled managerial target teams one gains the system emergent effect revealing productive results of team members' cooperation. The teams are created quite spontaneously when new educational/social/economic problems arise. These problems can be called the outer environment's disturbances. Thus, the teams are open self-determined, and self-organized educational systems reacting to these disturbances. The management capacity of the teams results from their multi-targeted nature, flexibility, and staff diversity since the members of the teams are recruited from various strata of society including educational institutions.

Keywords: synergetic, non-linearity, educational management, systemic effect, self-determinism of educational/social/economic systems, social synergy, social capital, self-organization, temporary self-ruled managerial target teams, system-target problem planning

JEL Classification: A20, I29, M10

INTRODUCTION

The process of globalization spreading on our planet entering the information society or the "society of knowledge" has revealed a new non-linear paradigm of social and educational systems management connected with widening the interdisciplinary investigations which are conducted on the basis of synergetics. The latter is the leading branch of interdisciplinary research being based on the fundamental principle of self-organization of natural and social systems since "synergetics endeavors to identify and understand the methods that Nature actually uses in coordinating Universe (both physically and metaphysically)" [1].

LITERATURE REVIEW

Synergetics provides a method and a philosophy for problem-solving and therefore has applications in all areas of human endeavors [1] including the phenomenon of social processes [2]. Originally, synergetics as an innovative branch of exact sciences has been applied in the research of some natural processes – autocatalysis phenomena (I. Prigozhin), laser radiation (H. Haken), etc. Later synergetic data have been extrapolated on social studies (H. Haken) based on the works of Ruth Benedict, Abraham Maslow, P.A. Sorokin, Erich Fromm who investigated the phenomena of social synergy, social capital and other phenomena [3-8].

The synergetic paradigm is widely applied in the education sphere since the modern trends of world development require the construction of an education system that would ensure the introduction into the educational field of integrative, synthetic knowledge obtained through interdisciplinary ties and the latest research. Thus the concept of synergy in the educational sphere has been rapidly developed by many Ukrainian scientists (G. Vasyanovich, O.Voznyuk, A.Evtodyuk, S.Klepko, B.Kushnir, B.Lutay, S.Tsykin, I. Yershova-Babenko, and others). The theoretical principles of the synergetic paradigm are extrapolated in the field of pedagogics, where the synergetic approach appears to be a theoretical ground for the analysis of educational systems.

Some scientists believe that the major objectives of synergetic education are: acquiring knowledge about the integral unity of nature, society and man as well as their coordinated development; the ways and means of solution of main human problems; development of intellectual and practical skills to study; education of personality value orientations, as well as motives, needs, habits of ecologically and culturally appropriate behavior; strengthening the capacities for nonlinear analysis of non-standard situations, alternative ways of development; formation of a non-linear style of thinking, a personality attitude to the world around, the ability to navigate in a rapidly changing technologized world; integration of natural science and humanitarian culture aimed at understanding and solving urgent human problems; learning the techniques of synergetic analysis, prognostication and simulating the evolution of a specific phenomenon, where social and natural factors interact [9].

Thus modern educational systems can be considered synergistic ones for which: openness is ensured by changing teaching and learning processes due to certain external factors; imbalance is a predetermined entropy entering the system in the form of a certain amount of information and leading to fluctuations in the learning process, nonlinearity is realized through multiple content, alternative forms and teaching methods, etc. which together represent different ways of developing the system; ability to self-organization is expressed in coherent actions of the structural elements of the educational process aimed at getting the attractor of education by reducing the entropy entering the system; complexity is expressed by a hierarchical structure of the educational system that reflects the features of the interaction components [10].

The authors of this article are developers of pedagogical synergetics in /the Ukrainian scientific space. Our papers reveal important aspects of the synergetic approach in the field of education that allows extending the theoretical and practical horizon of the analysis of the pedagogical systems, to outline the main aspects and trends of application of synergetic approach to the analysis of educational processes; to differentiate explicit synergetic aspects present in the domestic pedagogical thought, thus providing innovative approaches to education enabling to elucidate and solve specific educational problems; to formulate the basic principles of synergetication (optimizations) of the educational systems; to reveal implicit synergetic traits in the pedagogical systems as well as some synergetic regularities of transformation and development of educational systems [11; 12].

The synergetic paradigm applied in education sphere covers the phenomenon of social capital when the strategic directions of the development of effective educational systems in relation to their diversity and the level of social capital are being explored. Some authors have shown that an educational system can function effectively only if it has the ability to change in response to disturbances. The changes are possible only due to considerable diversity of the system. However, the diversity of a control subsystem should be no less. Therefore, the only way to achieve effective management is the delegation of administrative powers to public structures when the educational system can function as "soft", coordinating the contradiction between the public structures. With further growth of social capital, the public structures start more actively collecting and processing the "dispersed" information about educational problems and their solutions thus developing the network management. It is proved that the combination of the efforts of public organizations with the state ones, the self-governing, and educational structures create a synergistic effect, in which the management is based on small resonant effects and self-organizing. Thus the development of effective educational systems depending on the diversity measure and the level of social capital strategically reaches attractors according to the synergistic scenario on the direction of the rigid system, the systems with delegated administrative authority, "soft", with advanced network interaction

as well as the synergetic system. However, the trajectory of effective educational systems to attractors is defined by their capacity for self-organization [13].

AIMS AND OBJECTIVES

One of the problems in managing educational systems is related to the differentiation between different types of educational systems. As we have shown, in a rigid education system, control is exercised by the management of the institution almost without the participation of public structures. In a system with delegated managerial powers, it is advisable to involve the self-governing bodies of the educational institution in the implementation of certain microfunctions of control in educational subsystems. In a "soft" education system, the self-governing bodies of an educational institution can be involved in the implementation of individual micro-functions of control in the education system or in the implementation of control functions in its subsystems as a whole. In the system with network interactions, it is expedient to transfer control functions to self-governing bodies of the institution both in the education system as a whole and in its subsystems; other public structures included in the educational process may be involved in the implementation of certain micro-functions of control in the subsystems of the educational system. In the synergetic education system, it is expedient to delegate control functions in the educational system and its subsystems to the self-governing bodies of the institution; public structures involved in the educational process may be involved in the implementation of individual micro-functions of control in the education system or in the implementation in its subsystems of control functions as a whole [12].

We believe that delegating control functions to the self-governing bodies in the synergetic education system can be realized due to temporary self-ruled managerial target teams (TMT).

With taking into consideration the managerial problems mentioned above, and considering the spreading of the system and synergetics methodology in the sphere of modern science, it is particularly important to apply the main principles of synergetics methodology in the process of educational management. The purpose of this application is to conduct a synergetic simulation of the managing processes in the educational sphere with the result of building a comprehensive model of such a process.

METHODS

The research has been conducted on three methodological levels: 1) the general one covering the fundamental principles of synergetics [8], 2) the peculiar one covering the fundamental principles of synergetics realized in the sphere of educational management, 3) and the single one covering the synergetic principles realized in the sphere of educational management when these principles have been extrapolated on the concrete model of educational management.

This methodological approach being the traditional tool of cognition, which is almost fully implemented in dissertation research, allows to comprehensively cover the issues of the research.

RESULTS

1. The general methodological level and the preliminary adaptation of the principles of synergetic to educational/social management.

The system and synergistic approach to educational management stem from some concept units being developed by us to adapt the principles of synergetic (the general methodological level) to educational management. These units are as follows.

- 1) Self-determinism and self-organization of educational systems.
- 2) Instability, fluctuations, and unbalanced dynamics as constant changes in systems' functions provide different developmental fluctuations of educational systems for them to choose the optimal way of development.
- 3) Regular ruination of educational systems in the course of their development. Processes of chaotic character should be taken into account since the development of natural and socio-economic systems crosses the hierarchy and DE hierarchy (non-hierarchy) stages thus revealing the fluctuation processes (Fig. 1).

Chaos in the sphere of educational management systems stems from uncertain and ambivalent social and educational situations leading to specific problems that cannot be solved by a single, traditional approach in the process of decision making, revealing the spontaneous behavior of the subjects in the educational process.

It should also be noted that creative thinking is fundamentally open to uncertainty, and information chaos, which in the context of educational management turns up as certain socio-educational problems. The same relates to the regulatory field of education in Ukraine, which, like other aspects, also shows development, when new educational laws in some way contradict the old, non-existent laws that remain in virtual form against the background of old models of education, which have not yet been transformed into new models. This situation reveals the dialectical law of negation.

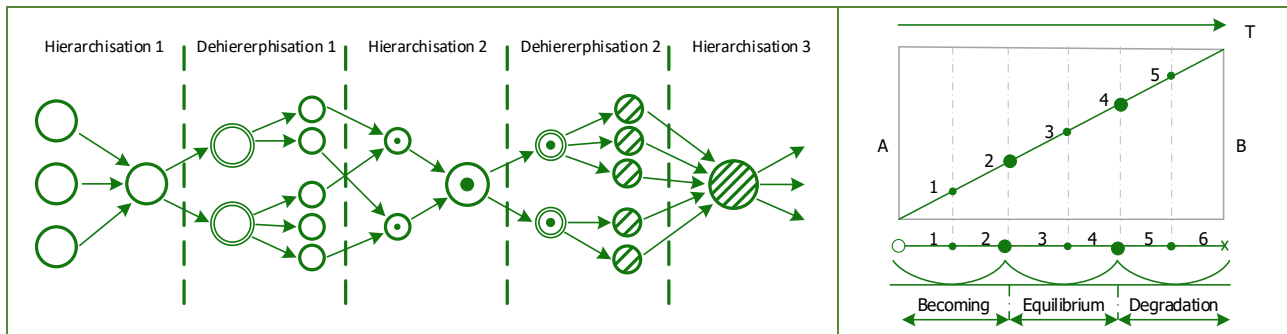


Figure 1. Synergetic models of development. (Source: developed by [15])

- 4) Dissipation, that is the openness of educational systems providing their self-development, that means partnership and cooperation of all the elements of these systems revealing their reflexive character and soft technique/mechanism of management [16], based on feedback and flexible interaction of all participants in the educational process.
- 5) Probable and multidimensional character of educational phenomena.
- 6) Attractors of educational processes. Attractors being relatively stable possible states of natural and social systems determine the development of any system entering a bifurcation stage where nonlinear perspectives are actualized by means of attractors.

Hence stem some principles of educational systems in terms of their management organization:

- 1) The ruling factor in any natural or/and artificial system is its most flexible, dynamic, neutral element (N.Wiener) since it can affect any element in the system due to the neutral and dynamic character of this ruling element enabling a wide range of its interactions.
- 2) Natural and social systems can be understood as nonlinear, dissipated integral and self-organized entities revealing emergent properties, to which the properties of all the elements of these systems are not reduced. So, the main concept of synergetics is a synergy that can be understood as "the behavior of whole systems unpredicted by the behavior of their parts taken separately" [1].
- 3) Homeostasis of any educational system rendering it its vitality is realized in the sphere of complex relationships of its constituents when the functioning of the system is provided due to the interaction of its constituents.
- 4) An educational system can be understood as a self-organized, self-determined, holistic entity, unfolding its internal essential developmental programs.
- 5) The management of educational systems is realized due to resonant influences that direct the latter to one of its own ways of development/evolution.
- 6) The development of any natural and social systems means their passing the hierarchy and non-hierarchy (DE hierarchy) stages.
- 7) Due to fluctuations and possible chaotic states of any developing educational/social system the latter can detect the ultra-small signals of its environment [16].

Here we can refer to the developed by W. R. Ashby law of necessary diversity, according to which any system can function in an effective way when it is able to change itself in response to possible disturbances of the outer environment. Then, the management efficiency in the sphere of system management can be achieved in the situation when the information diversity of the controlling subsystem must be no less than the information diversity of the controlled subsystem [17].

2. The peculiar methodological level as synergetic prerequisites to solving the problems of educational/social management.

The research of the peculiar methodological level presupposes the use of the phenomenon of social capital as one of the major factors of educational systems' evolution and development.

According to J. Coleman, social capital can be understood as any manifestation of an informal social organization that acts as a productive resource for one or more attractors. An integral component of the structure of social capital outlines the social/educational networks, including associations of teachers, parents, and public structures (boards of trustees, charitable foundations, groups of experts, etc.), without which the development of education is impossible. Under such conditions, social capital being realized through trusting relationships in the family, school, group, among neighbors, and in the local community have a far-reaching impact on students' life choices, their development, behavior, and academic success. Measurement of the level of social capital development is carried out on the basis of determining the level of development of public associations and networks, trusting relationships and solidarity, collective action and cooperation, information and communication, social unity, and inclusion in public activities.

Analysing the process of development of educational systems, we also use the concept of a measure of the diversity of the social system due to analysing the number of really existing different elements of the system, their characteristics, and relationships between them. Let us consider in more detail the features of the development of educational systems in relation to their degree of diversity and the level of social capital.

Let us have an educational system that has a low degree of diversity and functions as rigid within the framework of the initial level of social capital development. This type of educational system presupposes the state management model.

According to the law of necessary diversity (W.R. Ashby), the system, including the educational one, can function effectively only when it has the ability to change in response to possible perturbation [17]. Taking into consideration the exponential nature of modern civilizational changes [18], we can conclude that an effective educational system must be quickly and adequately modified in response to scientific, technological, and social challenges. However, the system can make the necessary changes only in the presence of a significant degree of diversity – in personnel, logistics, scientific, methodological sphere, and so on. Therefore, at this stage, the main task of educational management is to ensure the necessary diversity in the educational system.

At the same time with increasing the degree of diversity of educational systems, the requirements for their managerial components also increase. According to the mentioned law of necessary diversity, for achieving management efficiency the diversity of the controlling subsystem must be not less than the diversity of the controlled subsystem. Under such conditions, the only effective way to bring the controlling and controlled educational subsystems into harmonious relationships is to delegate some of the management powers to social structures that are sustainable (as opposed to artificial ones that are prone to decay). That is, at a certain stage of development of educational systems, when their degree of diversity increases in the conditions of growth of social capital, there are necessary processes of moving away from total control to a gradual delegation of managerial powers to self-governing and public structures. In this phase of development, the educational systems are transformed into systems with delegated managerial powers to ensure the effectiveness of their further functioning. Such type of educational management can be called the state-public one.

Scientists and educators-practitioners describe in sufficient detail the features of public structures in education systems, to which it is advisable to delegate management functions. At the same time, these structures as bodies representing the interests of teachers, students, parents, public structures, as well as state and self-governing governing bodies, often have different views on educational problems and the ways of their solutions. Therefore, to reconcile the current contradictions in democratic countries with the development of social capital, the methodology of "soft" systems is increasingly used, which is developed as a system-oriented guide to help deal with complex problems in social systems by identifying different views of social groups and the gradual achievement of mutual understanding between them [12; 13]. That is, with the development of social capital and the growth of diversity of educational systems the latter must function as "soft" to ensure sufficient efficiency. In this phase of development, the educational systems are transformed from state-public to a public-state model.

With the further growth of the level of social capital (to a sufficient level), public structures in education begin to more actively collect and process "scattered" information (Friedrich Hayek) concerning both real educational needs of students, parents, teachers, non-governmental organizations, government structures, employers, etc. and the suggestions on possible ways to solve the pertinent problems. This contributes to the development of networking of structures interested in solving educational problems, which is typical of public administration. Such characteristics as independence of network members, a unification goal, voluntary connections, multiplicity of leaders, and levels of interaction provide a high level of organization of social actions, which contributes to the achievement of synergetic effect, so the development of society leads to the expansion of network management.

Wide involvement in educational activities on the basis of networking the public structures contributes to the growth of the degree of diversity of educational systems and their ability to change in response to challenges (disturbances). In this phase of development, educational systems are transformed into systems with network interaction.

Finally, with a high level of development of social capital and a harmonious combination of efforts of public structures with state, self-governing and educational management structures there is a synergistic effect, which significantly exceeds the result of the simple sum of actions of each of these structures. This is a synergistic level of functioning in the educational systems. In synergetic systems the management processes are carried out on the basis of small resonant influences, pushing a system on one of its own favourable ways of development, with the maintenance of self-managed and self-supported development. We believe that the synergetic level of functioning of educational systems should be carried out with the help of temporary self-ruled managerial target teams.

The relationship between the phase states in which the educational systems are transformed in the process of their development, with the degree of their diversity and the level of social capital is given in Table 1.

Table 1. The relationship between the phase states of educational systems with the degree of their diversity and the level of social capital. (Source: developed by [12; 13])

| System | A level of systems diversity | The level of social capital | Theories that study the system management | Education management model | The main way of system development |
|---|------------------------------|-----------------------------|--|----------------------------------|---|
| Rigid systems | Low | Initial | General systems theory | State model | Increasing in system's Diversity |
| Systems with delegated management powers | Average | Low | The law of required diversity for subsystems management | State and public model | Delegation of powers to officially recognized public structures |
| Soft systems | Sufficient | Average | Soft systems methodology | State-public, public-state model | Development of "soft" interaction of official structures concerned with modernizing the Ukrainian education |
| Systems with advanced network interaction | High | Sufficient | Scattered information theory, network paradigm of education management | Public-state model | Development of interaction of the educational system with network structures |
| Synergetic systems | High | High | Synergetics | Public model | Development of self-organization educational system within the temporary self-ruled managerial target teams |

The principal problems concerning educational/social management can be solved by the use of a synergetic approach. Let us dwell on some points of this solution.

- 1) B.F. Lomov has shown experimentally that the relatively simple problems of managerial and labor character are better solved by the groups of people with a centralized interaction/communication grid, whereas the complex problems are solved in the best way in the absence of such a grid.
- 2) The attractors in synergetic processes must be connected with management decision-making.
- 3) According to the cyber-law of correspondence of the diversity of the controlling element/the controller to the diversity of the element being controlled, the diversity of information uncertainty in the development of a controlled element can be decreased due to a corresponding increase in the diversity of the controlling element [14] (refer to Table 1).

- 4) In the systems with a high level of social capital, within the socio-economic phenomenon of "time bank" associations, the above problems can be solved. The strategy of interaction within the activity of "time bank" associations may lead to one of the simplest and most effective forms of system-target problem management – to matrix-synergetic coordination of the works, presupposing the creation of temporary committees (teams) for solving difficult issues arising in the systems being controlled [19; 20].

This reminds us of the general theory of a functional system developed by P.K. Anokhin, which shows that functional systems are created (temporary unions of body structures with different functional modalities) for performing certain operations in the human body [21; 22].

By large, the members of temporary self-ruled managerial target teams can be recruited from state, public, and educational structures with the aim to solve concrete educational problems stemming from the current social situation. So the composition of the teams may differ in each concrete case, and this diversity in quantities and qualitative levels can be formalized only in theoretical approximation. The teams can be used mostly for solving urgent social problems at the initial state of their appearing for making preliminary decisions. The deepening of understanding of the problem can initiate the creation of other teams.

3. The single methodological level: synergetic simulation of managing processes in an educational sphere with the use of TMTs.

The analysed aspects of educational/social/economic management, due to their system and synergetic nature, are quite appropriate to be used in the field of managing specific educational processes. In this respect it is important to take into consideration that the functional ties of the elements of a TMT can be both vertical and horizontal, thus forming various functional configurations within the frames of certain temporary functional relationships, whose time limits can extend from several days to several years. And this means that several TMTs can be united into various management activities, thus forming a complex spatial-temporal hierarchical organization pattern.

According to the pattern of the management process (some goals → different ways of their implementation → certain methods → a set of resources), one can organize several TMTs, even more – a whole system of TMTs where a reflexive-monitoring TMT is needed to trace and analyse relevant educational processes at various managerial levels. These are the levels of both the state and its separate territorial subjects on state, regional, district, and territorial communities' levels (Fig. 2).

The managerial activity of the reflexive-monitoring TMT is based on the special monitoring methods (programs) for analysing the data obtained by the analytical and prognostic, managerial, and executive TMTs.

The managerial functions/actions of TMTs' participants are realized according to the cyber-synergistic principle of cooperative action when in the process

s of combining the elements of TMTs, they create an emergent effect of the system when the properties of each individual element of the system cannot be reduced to the integral properties of the whole system.

In this regard, one can refer to a psychological phenomenon of "the spirit of the sports team", being realized in such concepts as: joint activity (B.G. Ananiev, B.F. Lomov); a collective subject of activity (A.L. Zhuravlev); organizational identity (G. Cheney, M. Edwards); psychological climate (K.K. Platonov, G.V. Lozhkin); team roles (M. Belban, R. Weinberg); group mental states (S. Moskovici); professional spirituality (V.A. Ponomarenko, V. D. Shadrnikov) and others.

This regularity relates also to educational management. In the sphere of education, we can consider well-known methods of cooperative learning and management, when the ability to cooperate is actualized in a person when he/she faces the need to solve complex tasks that cannot be individually solved (refer to the heuristic method of brain-storm).

The initial point in the technology of cooperative/synergetic management of educational processes is connected with involving each member of TMT to join activities when an exchange of specific knowledge, skills, and competencies for obtaining integrative results in management activities takes place.

The TMT activity may be based on such social roles as "leader", "generator of ideas", "functionary", "anatomist", "critic", "researcher", etc. At the same time, the social role of a leader can be replaceable. This profoundly enriches the activity of TMT with new lease of life. Here we can mention A.S. Makarenko's temporary working teams when shuffling the member roles of these teams took place in the educational establishment of a great Ukrainian educator [23].

In all, we can talk about different hierarchical levels of TMT. These levels can be combined according to the cooperative-purpose principle in order to solve managerial problems (see Fig. 1).

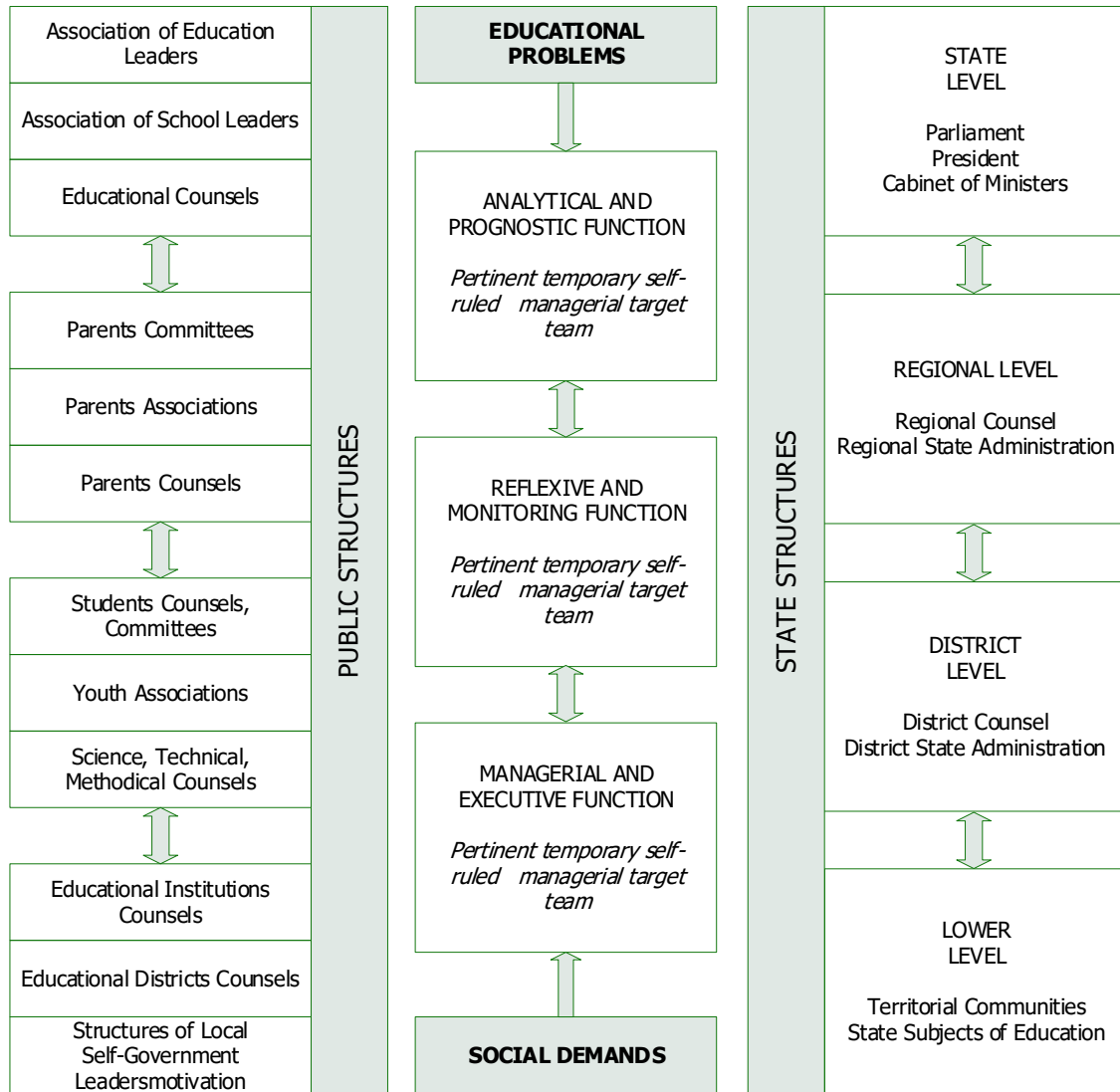


Figure 2. The synergetic model of educational systems management using TMTs.

Each team member is an expert in a particular educational/social/economic area. The limited competence and awareness inherent in any person determine the possibility of an expert's error. Let us suppose that the expert can make a mistake once in two hundred. Then the probability of correctly determining the expert's subjective assessment, due to the above factors, is 0.995.

Hence, the overall probability of the correctness of the subjective assessment given by the expert equals:
 $P_1 = 0.7 \cdot 0.7 \cdot 0.995 = 0.487$,

and the probability of an erroneous estimate equals: $P_2 = 1 - 0.487 = 0.513$.

The probability of obtaining an erroneous estimate based on the simultaneous acceptance of an erroneous estimate by all experts is defined as:

$$P_2 = [1 - (1 - 0.3)^2 \cdot 0.995]^4 \approx 149 \cdot 10^{-6}$$

It is obvious that an increase in the number of experts reduces the probability of making an erroneous decision and, therefore, an increase in the number of experts, which gives the estimate a static character and allows it to be averaged, is an important factor determining the correctness of the subjective estimate.

CONCLUSIONS

The conducted analysis enables us to state that educational management can be effectively carried out by means of TMTs being the collection of people coming together for a relatively short time "with a work plan, make decisions, develop recommendations, or take specific actions that are carefully thought through and useful...the team must come together and quickly coalesce and be productive almost immediately" [20].

The members of TMTs can be recruited from both different state and public structures and from educational institutions with the aim to solve concrete educational problems. These stem from current social events expressing certain social demands. The composition of the teams may differ in each concrete case; the teams can be used for solving urgent social problems in an expressway at the initial state of their appearing for technological "diagnosing" the problem and making preliminary decisions while further understanding the problem can initiate creating other teams.

The application of TMTs is realized according to fundamental synergetic principles and phenomena.

1. By using TMTs we gain a synergetic effect consisting of the emergent effect of the system revealing productive cooperative results. 2. The TMTs are created quite spontaneously when new educational (social, economic) problems arise. These problems can be called the outer environment's disturbances. So, the TMTs are considered to be open (dissipated) self-determined and self-organized educational systems. 3. The management capacity of the TMTs results from their multi-targeted nature, flexibility, and staff diversity since the members of the TMTs are recruited from various strata of society including educational institutions. 4. The activities of the TMTs due to their diverse staff are quite spontaneous and rather unpredictable. In terms of synergetics, such a property is a synergetic one, that is chaotic, creative, and nonlinear. 5. Due to the complexity and diversity of the TMTs and due to their fluctuating, chaotic and nonlinear activity they can react to different social disturbances and fluctuations, among them may be the weakest signals of social/political environment revealing some unpredictable tendencies of social developments. 6. The TMTs can be understood as self-determined and creative entities since their temporary staff is recruited from different educational/social/governmental bodies. So, the TMTs members are not strictly fixed to their social/business roles, so they are not materially dependent on TMTs activities which gain quite a creative character, since one of the fundamental characteristics of creative activities is connected with a non-pragmatic orientation of the personality involved in such activity [24-28] thus revealing non-adaptive modus of a creative artist working according to the principle "the art for the sake of the art". 7. Using TMTs is an important factor in determining the correctness of the subjective estimate of their members in the process of educational/social/economic management. 8. Using TMTs reveals the phenomenon of "diffused" specialization in management activities that presupposes synergetic activities of a team when each of its members contributes to this "diffused" specialization effect of the holistic team thus enriching the professional capacity of its members and increasing the "team spirit". Thus the "diffused" specialization can be applied as a means of education management, and as a means of continuous professional development of the participants in the educational/professional process.

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СИНЕРГЕТИЧНЕ МОДЕЛЮВАННЯ ПРОЦЕСІВ УПРАВЛІННЯ В ОСВІТНІЙ СФЕРІ В УМОВАХ ВИКОРИСТАННЯ ТИМЧАСОВИХ САМОКЕРІВНИХ УПРАВЛІНСЬКИХ ЦІЛЮВИХ КОМАНД

Ураховуючи поширення системно-синергетичної методології в сфері сучасної науки, особливо важливим є застосування основних принципів синергетичної методології в процесі управління освітою. Метою такого застосування є проведення синергетичного моделювання процесу управління в освітній сфері з результатом побудови комплексної синергетичної моделі такого процесу. Дослідження проводилося на трьох методологічних рівнях: 1) на загальному, що охоплює фундаментальні принципи синергетики; 2) на особливому, що охоплює фундаментальні принципи синергетики, які реалізуються в сфері управління освітою; 3) на одиничному, що охоплює синергетичні принципи, які реалізуються в сфері управління освітою, коли ці принципи екстраполюються на конкретну синергетичну модель управління освітою. З'ясовано, що системно-синергетичний погляд на світ виявляє певні фундаментальні аспекти поведінки природних і освітніх систем у контексті їх контролю та управління. Проведений аналіз дозволяє стверджувати, що управління освітою може ефективно здійснюватися за допомогою тимчасових самокерованих цільових управлінських команд. Члени команд можуть бути набрані й з різних державних, громадських структур, і з закладів освіти з метою вирішення конкретних освітніх проблем. Ці проблеми впливають із поточних соціальних подій, що виражають певне соціальне замовлення. Застосування тимчасових самокерованих управлінських цільових команд реалізується відповідно до фундаментальних синергетичних принципів і феноменів. Використання тимчасових са-

мокерованих цільових управлінських команд дозволяє досягти емерджентного системного ефекту, що виявляє продуктивні результати співпраці членів команди. Команди створюються досить спонтанно, коли виникають нові освітні/соціальні/економічні проблеми, які з позиції синергетики можна назвати збуреннями зовнішнього середовища. Отже, команди – це відкриті самовизначені та самоорганізовані освітні системи, які реагують на ці збурення. Управлінська здатність команд є результатом їх багатоцільового характеру, гнучкості, різноманітності персоналу, оскільки члени команд набираються з різних верств суспільства, уключаючи освітні заклади

Ключові слова: синергетика, нелінійність, управління освітою, системний ефект, самодетермінізм освітніх/соціальних/економічних систем, соціальна синергія, соціальний капітал, самоорганізація, тимчасові самокерівні управлінські цільові команди, системно-цільове планування проблем

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