

## Innovation Processes at Higher School as Object of Management

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**Abstract:** New prospects and tendencies of higher education need new methods of work in the field of education based on the most important principles of methodology of modern scientific thought. The article is devoted to the description of the role of the higher school staff as an object of management on the theoretic and reflexive analysis of management activities at higher schools. Under current conditions, the approach to determining the stages of social and innovation process based on the integration of innovation management and pedagogic ideas is quite appropriate. The essence of innovation process lies in its purposeful chain of activities on the initiation of innovations at higher school, development of new technologies, services and products, their marketing and further diffusion in the condition of higher school. The correlation of the pedagogic and economic aspects in the development of innovation processes at higher school can help to discover the phenomena connected with the development of the processes as well as the reasons impeding their distribution.

**Key words:** Innovation % Innovation process % Innovation motion % Higher school % Innovation management % Problem oriented management % Methods of management % Quality of education

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### INTRODUCTION

Under modern conditions, the effective development of society depends on the high intellectual potential of the nation. Nowadays, not only the potential of natural resources is important for successful functioning of economy in any country, but the quality of education as well. Education is the most important structural component of the social sphere, as it is a priority element of the system of social safety of citizens in the conditions of market economy and it plays the role of guarantor of professional advance and stable social position of personality in the society.

The higher education establishments of today became the rightful entities of the market economy. The requirements of the society to the quality of education are getting higher, the technologies of teaching are being modernized, the organizational and economic conditions of universities activities are changing and the competition at the market of educational services is growing.

Under conditions of market relations and competition, the issues of effective organization of innovation

activities at universities are getting more and more important. It is necessary to manage the innovation processes inside the educational establishments and it requires a deep scientific substantiation of the process, determination of conditions and mechanisms of effective innovations management.

**Analysis of the Latest Research and Publications:** A number of research devoted to different aspects of innovation processes and their management have been recently done. The innovations and innovation processes in education have been described by such scientists as K. Angelovsky, V. Zagvyazinsky, A. Narin and others [1-3].

The research of V. Bordovsky, T. Voronina and other authors is devoted to the problems of management of innovative processes [4, 5].

In foreign pedagogic, the problem of planning innovations and management innovative processes are studied by V. Adam, Ö. Barnett, G. Bassett, M. Kankaanranta, Sh. Kovach, N. Gross, A. Nicholls, E. Rogers, F. Levy, N. Law, T. Hargrave, J. Tid, J. Bessant, D. Strang, Y.M. Kim and other authors [6-18].

But the analysis of monographic literature, presentations of the participants of international scientific conferences on the problems of innovation processes management and study of practical experience of the innovation activities at universities made it possible to find out the following: the vast majority of modern research and practice in the mentioned field mainly concerned the improvement of organizational and structural mechanism of innovation activities and the incentives for acceleration of innovations introduction.

However, the research in the mentioned sphere is rather fragmentary and it requires further studies. At present, there appeared a certain precondition for qualitative changes in the system of innovation processes management at higher school.

The necessity of innovation development at higher educational establishments sets new requirements to the content, organization, forms and methods of management. It requires the new effective ways of innovation processes management, creation of conditions for improving the innovation activities at higher school and training lecturers, post-graduate students and students for participation in such activities, as well as finding the ways of management of the innovation processes. Those changes require a deeper scientific substantiation of the innovation activities management, stipulation of organizational and pedagogic conditions and development of mechanisms of innovation processes management at higher school.

**Aim of Research:** Specifying the meaning and determining the content and structure of innovation process at higher school.

**Basic Material of Research:** "Innovation" is a Latin word. It means a renewal, change, introduction of something new, a novelty. The motion of innovation is determined as a novelty and as a process of putting the novelty into practice [19].

Pedagogic innovation science, in contrast to pedagogic, is a young field. Nowadays, the pedagogic innovation science itself and its methodology are at the stage of research, empiric accumulation of data and their theoretical comprehension. Pedagogic innovation science is a theory of creation of pedagogic novelties, their assessment and assimilation in educational environment and, finally, putting them into practice [20].

The unity of three constituents of innovation process should be underlined, i.e. creation, assimilation and introduction of novelties.

It is the three-component innovation process that is the object of studies in pedagogic innovation science.

The first detailed description of innovation process was made by economist I. Shumpeter at the beginning of the XXth century who analyzed the new combinations of changes in the development of economic system (1911). Later, in the 1930s, I. Shumpeter and G. Mensch introduced the term "innovation" and the related terms "innovation process", "innovation potential" and others that became general scientific categories and enriched the terminology systems of different sciences [21, 22].

The meaning of innovation is determined as a process of putting the novelties into practice. Thus, according to A.I. Prigozhin, innovation is a purposeful change introducing some new and relatively stable elements in a certain social unit organization, community, group. Innovation is considered to be a complex, purposeful process of creation, distribution and use of novelty, the aim of which is meeting the demands and interests of people of new means, thus leading to certain qualitative changes of the system and ways of raising its effectiveness, stability and sustainability. The innovation process is connected with the transition to a qualitatively different state, the old norms, concepts and roles being revised and reconsidered. The innovations have their inner logic and trend determined by the logic of development from the novelty ideas to its introduction, as well as the logic of relations between the participants of innovation process. The innovation process is characterized by a certain stability due to the mechanism of self-production. Different sets of such mechanisms and their combination stipulate the variety of innovation processes and their individual features [23].

The authors of the system concept of innovations (N. Lapin, A. Prigozhin, B. Sazonov, V. Tolstoy) considered the variety of innovation processes to have two most important forms:

- C Simple reproduction characterized by the creation of novelty in that organization where its production has started. The cycle involves the following stages: formation of precondition for novelty, its necessity, scientific discovery, creation of novelty among users or the use of novelty;
- C Extended reproduction of novelty characterized by the distribution of the novelty production process in different organizations. In this cycle, between the creation of novelty and its distribution among users another stage is added, i.e. of distribution of novelty production methods and forms of its application.

M. Burgin suggests considering the following stages of innovation process:

- C developing a novelty.
- C studying the created novelty.
- C improving it by the specialists.
- C putting into practice, theoretical study of the novelty and its assimilation.
- C further development of innovation [24].

At present, the following scheme of innovation process stages has been formed in the scientific literature:

- C The stage of birth of a new idea or emergence of the concept of novelty; it may be called the stage of discovery which is a result, as a rule, of fundamental and applied research.
- C The stage of invention, i.e. creation of novelty realized in an object either material or spiritual model product.
- C The stage of innovation introduction at which the novelty is put into practice and improved. This stage results in acquiring a stable effect.

Further, the independent existence of novelty begins and the innovation process enters the next stage which is possible only under condition of susceptibility of the novelty.

At the stage of using the novelty, the further stages can be determined:

- C The stage of distribution consisting of a wide scale introduction and dissemination of novelty in different spheres.
- C The stage of novelty supremacy in a certain field when actually the novelty has ceased to be a new thing. This stage results in the replacement of the novelty by a more efficient one;
- C The stage of cutting the scale of using the novelty due to its replacement by a new product. In our opinion, it is not necessary for a concrete innovation process at higher school to include all the mentioned above stages in their strict succession and indissolubility. The described line of successive, replacing each other time stages of innovation process represents a simplified scheme of its actual development. The mentioned stages can be of a different duration.

The innovation process at higher school involves eight elements, the combination of which in a single successive chain forms its life structure.

The beginning of the innovation process at higher school is initiation, i.e. the activity dealing with choosing the purpose of social and educational innovation at higher school, setting the task of innovation, finding the idea of innovation, its pedagogic and economic substantiation and materialization of the idea.

Materialization of the idea means the conversion of idea to commodity, i.e. a new product, service or project of social and pedagogic technology.

Initiation is not only a starting point of innovation process but a basis for further normal way of its proceeding as well.

After the substantiation of a new product (service) the market research of supposed social and educational innovation is to be done. The purpose of the research is to study the demand, to determine the quantity, volume, consumers' features and properties that should be added to the innovation as a commodity entering the market. The next step is selling the innovation, i.e. the appearance of a small "batch" of innovation on the market, its promotion, assessment of efficiency and diffusion. The results of innovation marketing and costs of promoting undergo statistics processing and analysis on the basis of which the economic efficiency is calculated. The process ends in innovation diffusion.

Diffusion is a distribution of once applied innovation in other regions, educational establishments, new financial and economic situation, new pedagogic condition. Diffusion can be connected with changing the innovation features and conditions of its promotion etc.

The analysis of the innovation movement in the context of education development makes it possible to point out three important aspects of its social and pedagogic significance:

- C Innovation movement creates the prototypes of educational institutions of an open civil society.
- C Innovations are a real factor of developing the educational community and forming the professional associations in education.

Innovations are a bearing structure of the social and technological mechanism which transforms a reform and development of education into a new quality, i.e. constant and stable renovation of education [25].

The analysis of the literature [25, 26] and wide experience of higher schools make it possible to state that the innovation processes so far:

- C Are of an unsystematic character.
- C Do not cover all the fields.
- C are often of a forced character.
- C Not always are guided by scientifically grounded recommendations.
- C Are not coordinated with each other.
- C Do not have enough resources (labour, information, scientific and methodic, legal and organizational ones).

The organizational and managerial reasons having a negative impact on the development of innovation processes at higher school are as follows: inadequate level of influence of the innovation approaches authors on the processes of educational institutions development; professional incompetence of some managers and a certain part of scientific and pedagogic staff.

According to P. Shchedrovitsky [27], the main reason of modern crisis in innovation movement in the sphere of education is a management crisis.

Apparently, due to this reason the traditional systems of management are severely criticized for their undemocratic, commanding style of work, inability to solve the problems efficiently, fictitious character of activity preventing from positive reforms in the sphere of education and hypertrophy of administration and inspection control.

The traditional management systems in education were criticized by M.M. Potashnik and A.M. Moiseyev [28], who underlined their vivid political and ideological orientation which prevented from any manifestation of a different trend of thought or action. The system of management, being not just inertial and focused on reproduction of target standards, accumulated considerable experience of hampering the education initiatives and innovations. Neglecting the needs of educational system development, the management system, according to the authors, even less care of their self-renovation; their orientation on self-development practically is not seen, nothing to say about the creation of efficient mechanism of such self-development.

The problems existing in the system of education, their novelty and complexity prove that the knowledge about management is not sufficient. At present, there is an urgent need of development of new conceptual and

technological models of solving fundamentally new management tasks, which becomes possible if the innovation management is supported by a modern theoretical base.

Under innovation management we understand a process of organizing such purposeful impact on the object which results in the transition to a required state.

The object of such management is considered to be that part of educational environment of higher school the state of which requires changes and can be influenced purposefully, i.e. can be managed.

One of the most important statements of modern science of management is a postulate on the absence of good management in general. Management can be (and must be) efficient in relation to a concrete object.

Taking into account all mentioned above, it should be noted that properly organized, the so called resonant, impacts on complex systems are extremely efficient. They should be coordinated with the internal tendencies of complex systems development. Complex systems appear to be selectively and typologically sensitive and they demonstrate unexpectedly strong responsive reactions to the relevant to their internal organization resonant disturbances [29].

But for this purpose, the system of management should have an adequate to reality and rich in content image of the managed object. Such image becomes a means and instrument of managerial activity.

To manage the innovation processes it is important to take into account the law of management system unity which says that the managing and managed systems should make up a certain unity with cause and effect the relationship. What should be pointed out is that the higher a degree of conformity of the managing system to the managed one (i.e. an object), the more efficient the management. The mechanism of management in this connection should correspond to the abilities of subject and complexity of object.

The necessary diversity and complexity of the managing system should not be lower than that of the managed object.

To give a rigorous and comprehensive definition of complexity (including the complexity of the system or object of management) is not so simple. The subjective notion of object complexity is connected with the difficulty of solving the tasks. The objective characteristic of complexity depends primarily on qualitative and quantitative differences in the components and connections of the system, i.e. its quantitative and qualitative diversity.

The innovation processes at higher school as a complex object of management are characterized by the following features of complexity:

- C Absence of mathematic description.
- C Management objects behavior which makes the process of analysis difficult. A number of processes in education system appear to be unexpected and incidental.
- C Intolerance of management. The thing is that a complex object exists and functions irrespective of subject and its needs. Management has an external character in relation to object. It is natural that due to that fact any management upsets “normal” functioning of the object, i.e. changes its independent behavior and makes it independent of the subject.

The innovation processes are known to have their bearers - teachers and managers and their aims, directions and values do not often coincide and sometimes even contradict the purpose of management. That causes a negative reaction – the object “resists” and the education system as a whole impedes the changes.

- C Non-stationary, dynamic character. The more complicated an object, the faster its change. In education system, this process proceeds in natural dynamics and rapidly, which makes the management a difficult activity;
- C Non-reproduction of results. The feature is characterized by a different reaction of object to the same situation or management at different moments of time. The education system is constantly changing and ceasing to be itself. Under the influence of internal and external factors the unexpected reactions and certain changes occur, especially in the conditions of purposeful innovation activity. The result is that the aim of managing such a complicated dynamic object as the innovation processes cannot be achieved in full measure.

The mission of innovation management is to raise the receptivity of education to innovations, to aim it at constant renovation of integral education process, provide for achieving positive results and meet the demands of education services customers. Under modern conditions, there appeared an urgent need of transition from the practice of “elimination” of small defects and applying separate, local innovations to a long - term

innovation strategy in education. In this connection, in managing the innovation processes it is expedient to take into account a set of propositions formulated by I. Ansoff, T. Peters, R. Waterman [30]: unity of internal and external environment factors; openness of the system; catering for customers’ needs; ensuring the quality of services and assessment of quality by the customers; process approach and constant improvement; ability to function under conditions of constant changes; using the support of intellectual potential as a main source of innovation activity efficiency; management system orientation to strengthening the role of organizational culture and innovations, staff motivation and style of management.

At present, among a great number of various possible forms and methods of organization of innovations development and introduction process the program and aim approach is the most notable. However, the situation as for the methodology methods and practice of using the approach is such that, on one hand, there is a great number of project developments of different level and on the other, the practical effect of their introduction is small.

In our opinion, the existing practice of aim programs development and the system of their realization are merely the tactics of innovation processes management which provides for solving the tasks by the so called reactive method. Thus, there is an urgent need of further development of notion about the program and aim management which is caused by the following factors: the volume of innovations in the system of education is sharply increasing; the qualitative changes of innovations nature are taking place, the essence of which is the transition from realization of local modifying novelties to radical large - scale ones; the innovations start bearing a continuous character.

Thus, there occurs a task of developing a special type of management which is problem oriented, called to ensure the efficient realization of large scale, mass novelties making it possible to pass from episodic measure to creation of a stable mechanism of orientation, to the aims and tasks of a long term innovation policy. Practically, it is the question of using the method of outstripping influence on the course of events in the field of innovation activity.

Thus, a characteristic feature of problem oriented management is the use of outstripping management principles in it.

The problem oriented management is a clearly substantiated professional approach to management. Its use assumes the integration of all elements of the

management cycle into the whole, a thorough study of the organization coordination mechanisms and strengthening the role of management decision analytical base with the purpose of supporting a dynamic balance of the managed system with the external environment and its transition to a stable development condition.

Introduction of problem - oriented management assumes a solution of the following tasks: formation of innovation problems bank; development of prospective long term plans, projects and purpose programs on solving the important innovation problems; decentralization of management structure; formation of organizational and pedagogic mechanism of resource allocation; development of pedagogic staff's incentives and motivation system.

Different methods of management are used in the practice of modern higher schools functioning. According to A.A. Kharin and his co-author [31], the following technological schemes of management can be outlined depending on the management methods sensitivity to innovations:

- C Linear - the lower divisions managers submit to one manager of a higher level and it is through him that they are connected to a higher rank system.
- C Functional - every manager is entitled to give the instructions on the questions he is competent in.
- C Linear and functional - the arrangement and specialization of management process is carried out in the functional subsystem of the higher school.
- C Linear and staff - an analogue of the previous one, it assumes a functional division of management in staff services. The main task of the managers is to coordinate the activities of the functional services.
- C Program and purpose - based on the complex management of the whole system as a single object focused on a separate purpose.
- C Divisional - assumes a certain independence of divisions in organizing the activity. It makes it possible efficiently introduce the changes in certain divisions without involving the others. Such model of management provides for a closer interaction with customers and accelerates the reaction to the environment changes.
- C Matrix - a wide chain of horizontal relations, numerous crossings of which with the vertical ones are formed as a result of interaction of project managers with the managers of functional subdivisions. The model of management is formed on the principle of double subordination of the performers. Due to such organization the project

manager interacts with the members of the project group and with the staff of the functional departments, who are subordinate to him in a limited number of questions.

- C Matrix and staff - reflects all kinds of management and provides for a comprehensive coordination of activities between them keeping the unity of management and control at the highest level.

Whatever the innovation management at higher school is, it should, first of all, stimulate new ideas, encourage the introduction of novelties in the organizational structure of higher school, make the novelties an essential part of everyday operational work of the teaching staff. But it should be borne in mind that unlike the natural, spontaneously proceeding process, the innovation always has a character of "initiated and controlled changes based on rational and volitional action" [36].

The management directed to reorganization of the higher school system is such an action. Most of researchers consider the innovation potential of organization to be the main factor providing for the efficiency of system innovations at higher school. The innovation potential of organization is a complicated formation including a complex of factors and resources for successful development and implementation of innovation process [32, 33].

The innovation potential of organization includes the following: innovation potential of a manager; innovation potential of the staff; social, material and socio-cultural factors; conformity of structure and content of management at an educational establishment with assimilated novelties.

A system forming component of the given complex of factors is the innovation potential of the manager's personality which consists of the following: professional competence; being ready to organize the innovation activities; demand for innovation activity; system of manager's personal and business qualities [34].

Most of activities in the field of management require a strong individual development. And as a degree of a change increases, it becomes necessary to develop the innovation potential. The work of educational establishment manager under modern conditions is constantly changing, imposing heavy demands on him/her and requiring a strong ability of self-development. The innovation activity intersperses with a routine traditional activity of educational establishments and can be considered as one of the functions of the work of management.

In the last few years, the notion of “innovation intellect of personality” has been used as a scientific term, which means such way of thinking that makes it possible to realize and analyze a contradiction appearing in a culture and suggest the ideas for its creative solution which was not available at the previous stages of culture development.

Today, the problem of creative participation in solving difficult tasks in the field of innovation science made the research at higher school very important. The problem of education quality is not a new one for pedagogic theory and practice. It has been studied efficiently in different directions, such as: determining the notion of education quality; finding the ways of the most efficient evaluation of education quality; developing the forms and ways of effective interaction of all education levels; determining the factors ensuring a high quality of education; studying the market environment and education quality; developing the effective mechanism of education quality management etc.

Many scientists reasonably connect the idea of higher education quality management with the solution of four tasks: system cognition and phenomenon of quality; substantiation of purpose in the system of quality management; methods and means of influence on the managed object and quality of education; setting in motion a new mechanism of education quality management.

We support the point of view which says that the quality of higher education is a large scale, fundamental and multi -measured in composition, volume and content notion including the quality of enrolment, the quality of students training, the quality of interaction of levels and stages of education and others.

There exist different points of view on the dependence between the quality of education and factors stipulating it.

In our opinion, the system of factors determining the quality of education at higher school consists of the following complex:

- C Level of knowledge of university applicants, their personality and intellectual abilities.
- C Availability of all necessary equipment for the teaching process, textbooks, manuals, scientific literature, computers, etc.
- C Intensification of the teaching process, application of new efficient pedagogic technologies.
- C Quality of lectures and practical classes, quality of teaching.

- C Level of teachers’ abilities, their qualifications, moral and material incentives for the teachers at higher school.
- C Orientation of research to improving the education processes at higher school; extending cooperation with leading universities abroad.
- C Improvement of the forms and methods of students’ independent work.
- C Active introduction of information technologies in the teaching process.
- C Development of out-of-school forms of education work with the students.
- C Training of reserve pedagogic staff from higher school graduates.
- C Marketing, job placement, vocational guidance work.

Determining the main factors stipulating the quality of higher school education, in our opinion, is the important condition of developing the innovations models of the quality management.

Such models should reflect new mechanisms of educational process management at higher school. One of such mechanisms is the management according to results, which means the improvement of both the whole higher school organization and the system of management.

Thus, the quality of education directly depends on the quality of the system of management. The latter determines the quality of the result of higher school activity. This connection is appropriate and stable and in the conditions of innovation development of higher school it is necessary to develop new mechanisms of management.

Education quality management, as for the aims and results, is a special management which is organized and directed for achieving definite, prognosticated in advance with the most possible accuracy results of higher education, the results being prognosticated operationally, in the zone of potential development of a graduate.

The solution of education quality management problem cannot be made by one, even a universal model. In this connection, M. Potashnik suggests using the model of “value management of education” and treating it as a process of gradual, patient comprehension of education purposes by all participants of pedagogic process and further creation of common for all the staff spiritual culture.

It makes it possible for the teachers and managers to evaluate their activity using not only a traditional criteria of knowledge but also fix attentively the stages of personal upgrowth developed in the course of learning a hierarchy of common to all mankind values.

It is the model of “value management of education” that is innovational, as it promotes the development of features and qualities of student’s personality and sets the conditions for creative character of educational and pedagogic work.

In this context, the innovations and novelties are both the conditions and factors of education quality.

### CONCLUSION

The analysis of the problems of innovations development in education mentioned above makes it possible to come to conclusions which are important both for development of innovation component in the activity of modern higher education establishment and formation of the system of efficient innovation processes management.

An important aspect of innovations development at higher school is a degree of their demand. The regulation of innovation activity under such conditions is carried out by means of realization of scientific and technical and innovation programs developed on the higher school base.

In our opinion, the studies of the problems connected with organization of the innovation processes efficient management system at higher school are typical and prospective both in the scientific and theoretical aspect and in the aspect of practical realization of innovation management tasks.

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