ФИЗИКО-МАТЕМАТИЧЕСКИЕ

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MANAGEMENT OF INNOVATION PROCESS IN EDUCATIONAL INSTITUTION

Mukanova N.
University of International Business
Almaty, Kazakhstan

БІЛІМ БЕРУ МЕКЕМЕСІНДЕГІ ИННОВАЦИЯЛЫҚ ҮДЕРІСТІ БАСҚАРУ

Н. Муканова.
Халықаралық Бизнес Университеті,
Алматы қ., Қазақстан

УПРАВЛЕНИЕ ИННОВАЦИОННЫМ ПРОЦЕССОМ В ОБРАЗОВАТЕЛЬНОМ УЧРЕЖДЕНИИ

Муканова Н.
Университет Международного Бизнеса,
г. Алматы, Казахстан

Abstract. One of the leading trends in the management of innovative processes in educational institutions is the transfer of teaching staff from the “neutral state” in the zone of their increased motivation. The implementation of this task requires the head of an educational institution to master the algorithm of innovative activity of teachers, to determine the goals and prospects of the development of a particular educational institution. In this article, the peculiarities of the considered control system are based on four-level management (strategic, tactical, operational, and self-management), control system concerning the relationship between the functioning of the described system components and performance criteria for system management are defined. The author reveals the cyclic nature of process management, based on the organic unity of the school team, the essence of goals and tasks. In the article, a brief review of the literature on the management of innovative processes is presented in the section educational institution, didactic and psychological foundations of management are highlighted. Special attention is paid to the characteristics of new social and educational functions of the school, which require the use of modern approaches to solving the complex tasks set for the education system.

Аңдатпа. Білім беру ұйымдарындағы инновациялық үдерістерді басқарудағы жетекші бағыттардың бірі - профессорлық-оқытушылық құрамды «бейтарап» күйден ынталандыру ең басты міндет болып табылады. Бұл міндетті орындау үшін оқу орнының басшысынан оқытушылардың инновациялық іс-әрекет алгоритмін меңгеруді, нақты оқу орнын дамытудың мақсаттары мен келешегін айқындауды талап етеді. Бұл мақалада төрт деңгейлі басқаруға негізделген басқару жүйелері (стратегиялық, тактикалық, жедел, өзін-өзі басқару), басқару жүйесі жұмыс істеудің өзара байланысы тұрғысынан қарастырылады, жүйенің құрамдас бөліктері сипатталады және басқару тиімділігінің өлшемдері анықталады. Автор мектеп ұжымының тұтас бірлігіне, мақсаттар мен міндеттердің мәніне негізделген процесті басқарудың циклдік сипатын ашты. Мақалада оқу орны бөліміндегі инновациялық процестерді басқару туралы әдебиеттерге қысқаша шолу жасалынған, менеджменттің дидактикалық және психологиялық негіздері көрсетілген. Білім беру ұйымындағы жаңа әлеуметтік және тәрбиелік функцияларын сипаттауға ерекше көңіл бөлінеді, олар білім беру жүйесінің алдына қойылған міндеттер кешенін шешуде заманауи тәсілдерді қолдануға назар аударады.

Аннотация. Одна из ведущих тенденций управления инновационными процессами в образовании институтами является перевод педагогического коллектива из "нейтрального состояния" в зону своего повышенная мотивация. Выполнение этой задачи требует от руководителя учебного заведения институт овладения алгоритмом инновационной деятельности педагогов, определение целей и перспективы развития конкретного учебного заведения. В этой статье Особенности рассмотрены системы управления, основанные на четырехуровневом управлении (стратегическом, тактическом, оперативном, самоуправление), система управления с точки зрения взаимосвязи функционирования охарактеризованы компоненты системы и критерии эффективности управления системой определяются. Автором раскрыта циклическая природа управления процессом, основанная на органическом единство школьного коллектива, сущность целей и решаемых задач. В статье коротко обзор литературы по вопросам управления инновационными процессами представлен в разделе учебное заведение, дидактические и психологические основы управления выделены их. Особое внимание уделено характеристике новых социальных и образовательных функции школы, которые требуют использования современных подходов к решению комплекса задачи, поставленные перед системой образования.

Keywords: management, original solutions, problem, strategy, self-education, research skills, motivation, professional knowledge, creativity management, imagination, communication

Түйінді сөздер: басқару, бірегей шешімдер, мәселе, стратегия, өздігінен білім алу, зерттеу дағдылары, ынталандыру, кәсіби білім

Ключевые слова: менеджмент, оригинальные решения, проблема, стратегия, самообразование, навыки исследование, мотивация, профессиональные знания, управление творчеством, воображение, связь

INTRODUCTION

Domestic management science in the modern period is experiencing a particular stage of development. intensive development and renewal. There are many reasons for this, both external and internal: the implementation of reforms in society, the transition to market relations, criticism of authoritative management methods, the search for a national management model, etc. One of the factors that affect labor productivity is the following administrative activities of the head of a school: the study of the teaching staff, divisions and labor cooperation of heads of innovative educational institutions, rational organization of personal work of the head, self-assessment of the effectiveness of organizational and pedagogical activities. The concept of management of an innovative educational institution can be presented as a theoretical model of the system containing a set of leading ideas that determine the main directions of the system of this management, the main factors that ensure its construction and functioning [1].

Distinctive features of the management system are four-level management (strategic, tactical, operational, self-government); focus on the development of educational institutions and pedagogical collective activities; implementation of the feedback principle, which provides the necessary level of control real results; openness, self-replicating models. The management process is a complete open information system. Basic functional components of a control system of an innovative educational establishment are the purpose of the activities adopted by the entity management, the subjective model of the significant conditions, the program performing actions, the system of criteria for achieving goals, monitoring and evaluating actual results, the decision on the adjustment of the control system [2].

All components of the management process, being information entities, are dialectically interconnected and get their content and functional certainty only in the structure, and the complete management system. The management system of an innovative educational institution is associated with the definition of ways (methods) to influence the team, individual employees and training [3]. Based on the goals of administrative influence, in essence, in principle, all the methods used can be divided into three groups: psychological and pedagogical, organizational and administrative, economic [4].

MAIN PART

Innovation process-a set of measures to create, develop, use and distribute modern or modernized innovations (theories, methods, technologies, etc.). This is the process of transforming scientific knowledge into innovation, the process of consistently converting an idea into a product, technology or service; the process of motivation, purposeful, conscious, setting as the goal of transferring the education system to a new level, a qualitative state, a mode of development. The direction, pace, and effectiveness of innovation processes depend on the socio-economic environment in which they operate and develop, as well as on the quality of management [5].

The management system in modern science is interpreted as a set of human, material and technical, information, regulatory and other components that are connected so that the entire set of functions management is implemented [6].

Innovation management is a complex, multi-purpose process that includes a variety of actions, including setting strategic and tactical goals, analyzing the external environment, taking into account uncertainty and risk, analyzing the infrastructure and capabilities of an institution, diagnosing the actual situation, predicting the future state of the enterprise, searching for sources of creative ideas and their financing, and forming innovation portfolio, strategic and operational planning, management scientific and methodological development, improvement of organizational structures, analysis and evaluation of the effectiveness of innovations, development of strategies and tactics for innovative development marketing, diversification and risk management, etc. But as the main directions and problems of innovative management, in our opinion, need to be considered: development and realization of unified innovation policy; defining system strategies, projects, and programs; providing resource support and monitoring of innovative activities; training and training of teaching staff; formation of target groups, groups that implement innovative projects, creating an innovative environment [7]. Management innovation processes assume a combination of standards and eccentricity of combinations, flexibility and originality of ways of action, based on a specific situation. There are no ready-made recipes in innovation management. But it teaches how, knowing the techniques, methods and ways to solve certain problems, to achieve noticeable success in the development of the organization [8].

In recent years, innovations have been introduced in pedagogy. the introduction and dissemination of best practices have become regarded as types of innovation processes. One of these practices is the PISA test, which allows you to identify and compare changes in education systems in different countries, and assess the effectiveness of strategic decisions in the field of education, both based on one country over time, and between countries in a certain period. The main reason for the development of the test was that until the mid-1990s, there were no effective tools for evaluating and comparing academic indicators, other than the number

of years of schooling. Based on this indicator, it was difficult to judge what a person knows and can do.

In this regard, the OECD has developed the PISA test, which assesses not the amount of knowledge, but how to effectively apply it.

The test has been conducted every 3 years since 1997.

The target audience of the test is 15-year-olds since this is the age at which students in most OECD countries complete their compulsory education and decide to continue their studies or enter the labor market.

The test is aimed at a comparative assessment of functional skills in the areas of mathematical, natural science and reading literacy.

The results show not the level of academic knowledge, but the level of functional literacy, that is, how young people can apply the knowledge in practice, think logically, make informed conclusions, and interpret information graphs and diagrams.

Kazakhstan has been participating in PISA since 2009. The test is conducted every three years in three main subjects: mathematics, science and reading literacy. In total, the educational achievements of Kazakhstani schoolchildren were evaluated four times: in 2009, 2012, 2015, 2018. The first indicators were the lowest, and in the following years, our country rose in the ranking from 48 to 52 places. But at the end of 2018, the indicators for science and reading literacy were lower than their results in 2009. As seen in Fig. 1, in the period from 2009 to 2015, Kazakhstan showed positive dynamics, but in 2018 it fell sharply.

Предмет	2009	2012	2015	2018
Математика	405	432	460	**423**
Естествознание	400	425	456	**397**
Читательская грамотность	390	393	427	**387**

Figure 1. PISA scores by year and subject (out of 600 points)

In the PISA-2018 study, Kazakhstan showed lower results in comparison with the average indicators of the OECD countries.

The top ten of the PISA 2018 ranking included China (testing covered Beijing, Shanghai, Jiangsu, Zhejiang), Singapore, Macao, Hong Kong, Estonia, Canada, Finland, Ireland, South Korea and Poland.

From 2000 to 2018, the top five consistently include Finland, Korea, Japan, China, and Singapore [9].

The PISA testing system divides knowledge into six levels. according to the results of testing, 58.64 percent of Kazakhstani students cope only with the tasks of the lowest first level. This applies not only to the subjects of mathematics, science and reading literacy but also to other subjects taught at school.

Analysis of scientific publications has shown that ensuring innovation in education involves the study of a group of issues that need to be considered separately. These issues are the correct transformation of education, the development of digital products and methods of their implementation in educational activities, the introduction of innovative technologies, improving the quality of teachers, and the scientific component. The solution to these issues determines the need to expand the innovative activity of an educational institution that produces and implements pedagogical innovations in the practice of educational activities; the development of methodological recommendations on the transfer of scientific innovations to mass practice.

Modern management science is developing very intensively, at a rapid pace, it is a synthesis of theoretical developments and a judgment on the conclusions drawn from many years of practical activity. Questions of pedagogical innovation, search for optimal methods of training and education of the younger generation in the transition to an adapted school, a clear definition of concepts related to the formation of a new field of knowledge-pedagogical innovation, widely developed in the works of teachers: K. Angelovsky, E. M. Rogers, V. S. Lazarev, M. A. Moiseev, M. M. Potashnik, T. I. Shamama, etc.

The most important identified professional and personal characteristics of a teacher who is inclined to creative activity reflected in the works of G. G. Vorobyov,

S. V. Elkanova, V. I. Zhuravlev, V. I. Zagvyazinsky, N. K. Works by Krupskaya, A. S. Makarenko and N. D. Nikandrova.

Didactic and psychological bases of management of educational and innovative processes became the subject of detailed research Yu. K. Babansky, V. S. Lazarev, M. M. Potashnik, P. I. Tretyakov, T. I. Shamova, R. H. Shakurova, etc.

Theoretical and empirical research methods were used to solve the set tasks by the purpose and logic of the research. Theoretical methods: genetic interdisciplinary analysis and synthesis of information on the research problem presented in domestic and foreign scientific sources on philosophy, pedagogy, sociology, methodology, didactics, management. As well as the design and analysis of the results of experimental search work. For example, Norway's Experience of involving teachers in developing reforms can have a beneficial impact on education when They are given a real chance to change policies aimed at improving learning, as the Norwegian experience shows. In the early 2000s, after an OECD PISA study found that education in the country was not as good as expected, parliamentary hearings led to the adoption of new national legislation designed to raise standards. The legislation included national tests and new forms

of professional development and evaluation of teachers. However, teachers objected to the first national tests, as well as to the new forms of teacher development that were introduced in 2004.

CONCLUSION

The tests were revised in 2006 in collaboration with the Norwegian teachers ' Union. And new forms of professional development are reflected in the digitalization of education. The improvement in Norway's PISA results in 2009 is partly due to this effective collaboration [9].

Empirical methods: ascertaining and forming experiments, document analysis, mathematical-statistical and qualitative methods of processing results. Research on innovative processes in education has revealed several theoretical and methodological problems: the ratio of traditions and innovations, the content and stages of the innovation cycle, the ratio to innovations of various subjects of education, innovation management, training, the basis for new assessment criteria in education, etc. These problems require a different level of the solution - methodological. Justification of methodological foundations pedagogical innovations are no less relevant than the creation of their innovations. Pedagogical innovation is a special area of methodological research.

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ON THE TENSION OF A CYLINDRICAL ROD OF VARIABLE CROSS-SECTION

Petrov N.I.
Department of general physics,
Chuvash State University,
45 Moskovsky Prospekt, Cheboksary, Russia

Abstract. The theory of small elastoplastic deformations is widespread in the field of structural analysis. In this paper consider the stretching of an in_nitely long cylindrical rod of variable cross-section. The results of solving the linearized equations of the theory of small elastic-plastic deformations [1-7] in the case of an axisymmetric problem are used. It is assumed that a simple stretch occurs in the initial state. In the first approximation, the relations for the components of displacements, deformations, and stresses are obtained. Solutions are expressed in terms of zero -and first-order Bessel functions.

Keywords: stretching, displacement, deformation, stress, boundary, conditions, linearization, Bessel function.

In the case of axisymmetric deformation, the relations of the theory of small elastic-plastic deformations have the form [1-2]

$$\sigma_r - \sigma = \frac{2}{3}\frac{\sigma_i}{e_i} e_r \,,$$

$$\sigma_z - \sigma = \frac{2}{3}\frac{\sigma_i}{e_i} e_z \,,$$

$$\sigma_\theta - \sigma = \frac{2}{3}\frac{\sigma_i}{e_i} e_\theta \,,$$