# Управління в складних системах

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## INFORMATION AND ANALYTICAL SUPPORT OF THE EDUCATION QUALITY MANAGEMENT SYSTEM

**Abstract.** The article analyzes the problem of informational and analytical provision of the education quality management system. The purpose of the article is to determine the role of modern information technologies in the process of improvement and modernization of the educational system. The components of the information system of quality management, which is defined as a set of interconnected or interacting elements of the organization for the development of policies and goals, as well as processes for achieving goals in the field of education quality, have been studied. It is proven that the formalized information system of education quality management creates a basis for planning, implementation, monitoring and improvement of education quality management activities.

**Keywords:** information system, information technologies, quality of education, quality management.

### Introduction

The process of informatization is inextricably linked with the status of today's society, namely with the status of the information society, which is dominated by information, its quality, freedom, publicity and accessibility. Informatization is a large-scale process that affects all spheres of social life, aimed at satisfying people's information needs, as well as building a powerful telecommunications infrastructure.

The process of informatization of education includes a system of measures: equipping educational institutions and educational management bodies with hardware and software tools of information technologies; connection via high-speed channels to regional, national and international computer educational networks, to the global Internet; creation and placement of educational information resources, integration of various databases at the regional and state level. formation of information culture among all participants of the educational process: employees, teachers, future specialists, their parents, creation of a system of continuous training of teachers in information technologies (courses, express courses, mini-seminars, permanent seminars, conferences) [1, 2].

Modern society is characterized by constantly developing information technology (IT) tools. Objectively, the process of informatization of society significantly affects the goals and content of education, presents new requirements for the professional training of specialists in the field of using IT tools.

**Analysis of recent research and publications.** The analysis of the works of leading experts in the field of research into the issues of information and analytical support of the education quality management system allows us to establish the relevance of the identified issues. The problem of determining the role of modern information technologies in the process of improvement and modernization of the education system is being investigated by a number of leading foreign and Ukrainian scientists. The researches of such experts as M. Bublyk, A. Karpyak, O. Rybytska are dedicated to the study of the components of the modern informational educational space, in particular, the analysis of the structure of the standard and the study of its content [3, p.116]. A. Kapiton, O. Skakalina, R. Baranenko, T. Franchuk consider the relevance of using relevant search in the process of developing an information system [1, p.64]. N. Chukhrai and T. Shcherbata indicate the need for cooperation between higher education institutions and enterprises working in the field of information technologies [4, p.161]. N. Popadynets, E. Korcelli-Oleynichak, M. Melnyk, and N. Chorna analyze the leading methods of designing an information system for managing the quality of education [5, p. 19]. The analysis of the main components of the quality management information system is devoted to the work of S. Alyoshin, O. Borodina, A. Hafyak, O. Nosach [2, p.364].

### Main part

It is necessary to understand and evaluate the possibilities of information technologies for the fuller development of the personality of students, to see how it is possible to most organically integrate learning information technologies in the educational process. The question of the role of modern information technologies in improving and modernizing the existing educational system has remained relevant for several decades. Successful implementation of the education modernization program will require not only modern technical equipment of universities, but also appropriate training of teachers and organizers of the education system. Thus, for every teacher, the main goal is to ensure the quality of education, which can be facilitated to a greater extent by the use of information technologies. IT in the educational society can be considered as a means of self-realization and self-

affirmation of teachers, which significantly increases the level of their professional culture, which expands the possibilities of sharing accumulated experience, own views, and also helps to move from the role of a teacher-translator of knowledge in class to the position of a teacher-tutor who organizes and directs the process of independent cognitive activity of students. Information technologies play an important role in the development of teaching methods, because the work of each teacher is important for methodical and pedagogical science as a whole.

A project is an event that includes a concise description of a defined need for public space and requires its implementation. The objects of quality management of the developed project are products and processes. The evolution of the development of the approach from product quality management to the general management of the quality of the organization's activities involves the creation and ensuring the effective functioning of the quality system, which includes the necessary organizational structure, procedures, processes and resources [1, 2, 3]. A quality management information system (QMIS) can be defined as a set of interrelated or interacting elements of an organization for the development of policies and goals, as well as processes for achieving goals in the field of quality. A formalized QMIS creates a basis for planning, implementing, monitoring and improving quality management activities.

The standards contain requirements and explanations for their application to the following QMIS processes:

1) product life cycle processes (group of main processes);

2) resource management (a group of resource provisioning processes);

3) management responsibility (group of management processes);

4) measurement, analysis and improvement (a group of processes of information and analytical support for management and development).

The operational structure of the "Quality Management at the Enterprise" process includes the following operations:

1. Creation of quality requirements (determination of indicators critical to quality; determination of preventive measures for quality assurance; verification of compliance with the quality plan; verification of possibilities for ensuring compliance with requirements; completion of the quality plan);

2. Assessment of compliance with requirements (checking compliance with the quality plan; assessment of test results);

3. Management of non-conformities (assessment of potential impact; determination of immediate measures; identification of causes; elimination or taking of preventive measures; closure of non-conformity);

4. Implementation and support of the quality management system at the enterprise (definition of the management strategy; planning and deployment of specialized software for the quality management system (scope, goals and objectives); definition of the key

processes of the quality management system, management bodies and indicators; development and documentation of regulations, procedures, standards and indicators of quality management, evaluation of the performance of the quality management system, creation of the environment and competencies for the improvement of the quality management system.

In essence, management of the quality of higher education refers to situational management, which is based on: formation of options - alternatives of management decisions; solving problems of current and prospective preparation of plans. The growing importance of the use of modern information technologies in the education process is currently caused by many factors, and first of all: the complication of the pedagogical process in the educational institution in the conditions of the integration of special disciplines, as well as the integration of the educational institution with advanced companies and research organizations; the expansion of the subject world of the student, which leads to an increase in the volume of educational material and the need for its generalization; expansion of spheres of activity, which leads to the need to solve various professional tasks: project, research, technological; inclusion in the learning process of promising technologies, including the base of modern telecommunications and computing tools.

Thus, information technologies in education are a kind of response to changes in the system of higher professional education related to the optimization of management of students' cognitive activities. Fulfillment of the listed conditions contributes to the achievement of the main goal of education modernization - improving the quality of education, increasing the availability of education, ensuring the needs of the harmonious development of an individual and the information society as a whole [4, 5].

The application of the developed project begins with "identifying the need" by studying official documents, surveys, focus groups, etc. At the first stage, the results of project implementation are determined. On the second stage, the consequences of specific transformations are specified, which is a step for monitoring and evaluation even during the planning of the project itself.

The third stage of direct project implementation includes: project improvement planning; implementation of certain processes; carrying out certain operations: promotions, trainings, consultations, publications, etc. The fourth stage is the monitoring of the project implementation process, as well as the evaluation of short-term results.

The fifth stage involves the assessment of long-term results or "consequences".

The results of this final assessment help to determine a "new need" and to start a new project.

Constant quality control of the project is necessary at all stages of its planning, preparation, direct implementation and until the stage of achieving the final goal of the project were taken into account, looks as shown in Fig. 1.
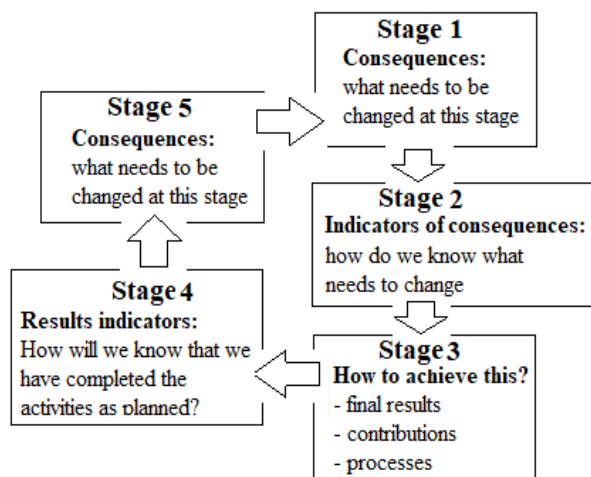
**Fig. 1.** Monitoring in the project cycle

The information system has the following recommended hardware requirements:

Server: 1 GHz processor, 512 Mb RAM, 500 Mb RAM;

Client: 800MHz processor, 256MB RAM;

Software requirements: OS Windows XP, Vista, 7; Linux; iOS;

Browser: Opera, Google Chrome, IE 8, FireFox, Flash Player 11.

The advantages include: the possibility of implementing almost any site (from a business card site to a portal and an online store); a huge number of ready-made design solutions; relative simplicity of content management; ease of setup. Administration of the designed system is carried out using CMS. To access the administrator panel, you must log in by entering the system administrator's personal data, namely: enter the administrator's name; enter the password specified during registration; choose the language of the administrative section management interface from the list of installed ones (English, Russian or Ukrainian); human, material and organizational resources can be allocated on the basis of data on the progress of work.

## Conclusions

The main feature of the result-oriented management model is the need to make assumptions, identify risks and overcome these risks. As already mentioned, the process of achieving results is based on a cause-and-effect relationship. If causality holds, then the assumptions made during design will also hold. That is why, in order to achieve success, it is necessary to have a plan that recognizes the risks and identifies strategies to reduce the risks to the minimum possible. The input data for the planning and development of the project of educational activity are : educational and professional program; curriculum by specialty for the appropriate level of training (bachelor, specialist, master); working curriculum for the academic year. Input data in the planning and development of a project of scientific activity are: customer requirements; requirements of the current legislation of Ukraine and regulatory and technical documentation.

In the presence of complete information about the course of project implementation, it is possible to know: directions in which the achieved results can be strengthened; difficult directions can be strengthened, different approaches can be tried or measures can be added; measures and system results, which are recognized as unnecessary, can be removed; information about the results of the work progress will help to understand what is working and what is not; it is possible to increase assistance to target groups or add new such groups.

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**Інформаційно-аналітичне забезпечення системи управління якістю освіти**

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**Анотація.** У статті аналізується проблема інформаційно-аналітичного забезпечення системи управління якістю освіти. Метою статті є визначення ролі сучасних інформаційних технологій у процесі вдосконалення та модернізації системи освіти. Досліджено компоненти інформаційної системи управління якістю, яка визначається як сукупність взаємопов'язаних або взаємодіючих елементів організації для розробки політики та цілей, а також процесів досягнення цілей у сфері якості освіти. Доведено, що формалізована інформаційна система управління якістю освіти створює основу для планування, реалізації, моніторингу та вдосконалення діяльності з управління якістю освіти.

**Ключові слова:** інформаційна система, інформаційні технології, якість освіти, управління якістю.