

Management of the Educational Process Using Information Technologies for High-Quality Training of Specialists in Higher Education Institutions

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Summary

The article describes the content of managing the educational process by means of information technologies for high-quality training of specialists in higher education institutions. The main components of the quality management system for training personnel in higher education institutions are highlighted. The strategy of higher education institutions is marked out. Managing a higher education institution requires solving strategic, practical and operational tasks. The content of the main concepts of the study is justified. The main components of the quality management system for training personnel in higher education institutions are listed. The analysis of management functions that play a central role in the development of an educational institution is presented. It is emphasized that one of the main conditions for optimizing the strategic planning system of higher education institutions is a target orientation to achieve maximum economic efficiency and effectiveness, as well as taking into account the disadvantages and advantages of strategies for integrating educational and research institutions within the scientific and educational complex to carry out joint activities, taking into account the interests of all participants in the educational process. In the conditions of the information society, the priority becomes the information and analytical activity of the manager of an educational institution, which is characterized by an increase in the number of types, sources, and flows of information, constant updating of its content, and the implementation of a number of sequential actions on information, that is, data processes. Software for higher education institutions is presented and the advantages of an automated educational process management system for high-quality training of specialists in higher education institutions by means of information technologies are shown.

Keywords:

management, software for higher educational institutions, automated management systems of an educational institution,

training of specialists, institutions of higher education, educational process, information technology tools.

1. Introduction

The quality management system for training specialists should be aimed at achieving an optimal degree of ordering of pedagogical activities, taking into account social, economic and state needs. Therefore, it needs high-quality modernization and adaptation to pan-European standards, and this is impossible without proper support from the state and solving a number of essential issues, among which we can distinguish such as the lack of awareness of society about the essence of educational and qualification levels, the low degree of readiness of domestic higher education institutions for fierce competitive competition in the market of educational services and weak material and technical support for the educational process [2].

It is necessary to improve the mechanisms and procedures for training specialists – research and teaching staff and highly qualified scientists, which requires the decentralization of management with the transfer of part of state powers to universities. Such processes can be both positive and negative in nature. But awareness of such results and their forecasting is one of the main tasks of our time. At the same time, improving the level of compliance of education with modern requirements and implementing an educational policy in the field of quality of education is possible only taking into account the functions of modern educational institutions as a social institution, the leading

function is to update social values and norms by working out new and adopting progressive values from the world educational experience, adequate to the socio – historical conditions of Ukraine [2].

The purpose of higher education today is to train specialists who can ensure the transition from an industrial to an information technology society through innovation in education, training and scientific and methodological work. That is why special attention is paid to the issue of ensuring the quality of education in higher educational institutions. The quality of college degree is a multidimensional concept that covers all aspects of the activities of a higher educational institution: educational and academic programs, educational and research work, teaching staff and students, educational, material base and resources. The institution of Higher Education provides services to three subjects – customers of the educational process, that is, production for which qualified personnel are trained; a person receiving education; and the state acting as a guarantor of the educational process. Quality management of training of highly qualified specialists is based on monitoring compliance with state requirements for the level of training and is provided by external (in relation to the higher educational institution) procedures for licensing educational and professional programs, certification and accreditation of college degree.

The main components of the quality management system for training specialists in higher education institutions should include: personnel support of the educational process; development of requirements for the contingent of students; determination of the characteristics and conditions of the certification system of students; development of indicators of educational and methodological support of the educational process; determination of the level and characteristics of the educational and laboratory base; development of types and characteristics of technologies used in the learning process (including independent and individual work of students); determination of information and library support of the educational process; development of other special conditions stipulated at admission [23].

With Ukraine's choice of a course for integration into global, and above all – European, structures, the question arose about the need to adapt the domestic management system of higher education institutions to European recommendations. The basis of such adaptation is the introduction of modern quality management systems for the provision of educational services, which are an integral part of the management system of higher educational institutions, regardless of their ownership forms.

Solving the problem of introducing modern quality management systems for the provision of educational services is closely related to the problems of reforming the higher education system as a whole. This includes the transition to a three-level education system, the introduction

of an international system for assessing the knowledge of students, modern systems of attestation and certification of college degree, solving problems of structural adjustment of the higher education system, etc. [3].

Each institution of higher education needs to take significant steps towards the implementation or design of such an automated information and analytical system that would be able to combine the work of administrative, financial, economic, educational and scientific departments, and contribute to the integration of all processes that are aimed at ensuring appropriate conditions for meeting the information needs of all participants in the educational process, developing their intellectual potential, self-realization and self-improvement, as well as high-quality preparation of students for a full-fledged future professional activity and life in the information society. The importance of using such systems is increasing, because with the intensification of the introduction of Web-oriented educational spaces, which is an integral part of the modern higher education system, it becomes possible to manage, optimize and obtain analytical information about the main activities of the University's structural divisions on the basis of remote access.

Analysis of numerous works of domestic and foreign scientists in this field shows the presence of a significant number of functioning systems for this purpose, but there is no single approach to designing high-quality automated systems for managing the learning process in higher education. Taking this into account, the problem of creating such Web resources that allow you to control the educational process and contribute to its effectiveness gives relevance to the outlined issue as having social significance [5]

Purpose. The purpose of this article is to determine the theoretical foundations of educational process management by means of information technologies for high-quality training of specialists in higher education institutions.

2. Analysis of recent research and publications

The problem of quality of education management is covered in the works of scientists. R. Kvarthenko, who interprets management as a process of influencing the system to transfer it to a new state or to maintain it in some established mode [8]. G. Timoshko reveals the modern direction of managerial activity – management of educational organizations [28]

M. Mirovskaya considers case management technology, which is a certain methodology for organizing and running the educational process, to be a leading technology that can ensure a stable quality of educational services provided by a college degree and form a competitive specialist [16].

Kotiash, I., Shevchuk, I., Borysonok, M., Matviienko, I., Popov, M., Terekhov, V., Kuchai O. reflect that the use of

multimedia technologies in the educational process of higher education institutions lets to move from a passive to an active way of implementing educational activities, in which the student becomes the main participant in the learning process [6].

Bakhmat N., Voropayeva T., Artamoshchenko V., Kubitskyi S., Ivanov G. study the quality management in higher education in terms of sustainable development [1].

Oseredchuk, O., Drachuk, I., Teslenko, V., Ushnevych, S., Dushechkina, N., Kubitskyi, S., & Chychuk, A. consider new approaches to quality monitoring of higher education in the process of distance learning [18].

Vozniuk A., Kubitsky S., Balanovska T., Chip L., & Dorofeev O. examine the synergetic modeling of management processes in the education sphere using temporary self-managing purpose-managing teams [31].

Vorobyova, O., Horokhova, M., Iliichuk, L., Tverezovska, N., Drachuk, O., & Artemchuk, L. consider the ISO Standards as a Quality Assurance Mechanism in Higher Education [30].

Shunkov, V., Shevtsova, O., Koval, V., Grygorenko, T., Yefymenko, L., Smolianko, Y., Kuchai, O. examine the use of the use of network and multimedia technologies in the training of future teachers depends on the level of conceptual development of pedagogical tools used in the organization of educational and cognitive activities of students; from the degree of adaptability of the educational and information environment of training a modern specialist to his professional environment; from the level of readiness of students to perform professionally-oriented tasks with the help of network and multimedia technologies. [22].

N. Bezlyudnaya, V. Boychenko, A. Bialik, M. Gagarin and others substantiate theoretical provisions and develop practical recommendations for improving the management of educational institutions and modernizing the professional training of future heads of educational institutions [9].

E. Rogov analyzed the subject area, modern methods of creating such systems. The choice of architectural concept and technologies for implementing the educational process management system was made, both on the client side and on the server side. A learning process management system was implemented, namely an electronic journal, which made it possible to train teachers, parents, and students more conveniently, more organized, and more efficiently [21].

Kuchai, O., Skyba, K., Demchenko, A., Savchenko, N., Necheporuk, Y., & Rezvan, O. check the role of multimedia education in the progress of the information society. The information range is proficient both as a separate sector of the economy and as a factor in the modernization of education [7].

3. Research methods

Theoretical methods-analysis, synthesis, comparison and matching, induction and deduction, analogy, which made it possible to characterize the state of working out the problem in scientific sources.

4. Results and discussion

Globalization, changing technologies, the transition to a post-industrial, information society, the establishment of sustainable development priorities, other features inherent in modern civilization, determine human development as the main goal, key indicator and main lever of modern progress, the need for radical modernization of the industry, set the state, society the task of ensuring the priority of the development of education and science, the priority of solving their pressing problems. The urgent task is to ensure that quality education is accessible throughout life for all citizens and further to assert its national character.

The content of education and the organization of the educational process should be constantly updated in accordance with democratic values, market foundations of the economy, and modern scientific and technical achievements. The state of funding for education and science remains critical, and the level of remuneration for education and science workers is insufficient.

It is necessary to significantly strengthen the educational and material base, computerize educational institutions, introduce information technologies, ensure effective training and advanced training of teachers, research and teaching staff, and introduce new economic and managerial mechanisms for the development of Education. All these problems require a priority solution [10].

Scientists have different approaches to the definition of "Management in Education". The pedagogical terminology dictionary defines "education management – as a purposeful activity of management entities at all levels, aimed at organizing the functioning and development of the education system [19].

E. Dedyukh [4] defines management as a specific human activity aimed at making decisions, organizing control of the object of management according to the purpose, analyzing and summing up results based on reliable information. Draws attention to the fact that the concept of "management" is multifunctional and complex, because it has a large number of definitions and details, depending on the context in which it is used. The management process is defined primarily as the activity of management entities, the activity of management entities united in a certain system, aimed at achieving the goals of the organization through the implementation of certain functions using management methods [12]. E. Dedyukh [4] also draws attention to the fact that the scientific literature

finds its own corresponding interpretation of both the concept of "process management" and the concept of "management process". The first is interpreted as "...a set of measures for planning and monitoring the implementation of the process. This is the application of knowledge, skills, tools, techniques and systems to define, visualize, measure, control, report and improve the process in accordance with the goals formulated by the customer" [20], and the second as "...implementation of interrelated managerial functions necessary in order to form the goal of an educational institution and successfully implement it" [17].

G. Timoshko claims that the management of educational organizations is a modern direction of management activity, which is aimed at achieving certain goals by educational institutions through the rational use of material, human and other resources using scientifically based forms, principles, functions and methods. These educational organizations operate in market conditions and are a type of social management [28].

Managing a higher education institution requires solving strategic, practical and operational tasks.

Strategic management tasks are determined by the long-term consequences, significant impact on all areas of activity of a higher educational institution. Examples of strategic management tasks are the opening of new specialties, departments, faculties, branches, construction of premises, purchase of expensive educational equipment, and so on. The strategic tasks of the department also include the development and implementation of principles and rules for remuneration and additional incentives, recruitment, distribution of financial flows, etc. [25].

The strategy of a college degree should contain:

- assessment of the uniqueness of Higher Education Institution in meeting the needs of interested parties and the market niche;
- prospective analysis of the development of the educational services market;
- priority areas of Higher Education Institution activity;
- analysis of the state of Higher Education Institution and success in implementing the strategy;
- risk analysis and prevention mechanisms;
- analysis of available resources and their sufficiency for the implementation of the set goals [15].

The main components of the quality management system for training personnel in higher education institutions include:

- staffing of the educational process (training system, for example, through postgraduate studies, doctoral studies, and the Institute of applicants);
- development of requirements for students (brought to students after they are enrolled in the student list);
- determining the characteristics and conditions of the student certification system;

- development of indicators of educational and methodological support of the educational process;
- determination of the level and characteristics of the educational and laboratory base;
- development of types and characteristics of teaching technology (excluding independent and individual work of students);
- definition of information and library support for the educational process;
- development of other special conditions stipulated at the time of admission [11].

The central place in the development of an educational institution belongs to the functions of management.

The analytical function is aimed at analyzing management information, identifying problems, establishing patterns and trends in the development of individual phenomena, establishing cause-and-effect relationships, objectively assessing the situation, making a forecast and modeling the future. Various types (operational, thematic, complex, final; morphological, structural, functional, genetic) and methods (theoretical, informational-stating, rating, and productive) of analytical activities of the head of an educational institution allow us to comprehensively study all components of the educational institution's system. Planning is a management function, the essence of which is to determine prospects, goals and ways to achieve them. The conditional model of a function can be represented as a chain: problem (topic) – goal – task – set of measures – predicted results. The essence of the organizational function of management is to determine the place and role of each member of the team in achieving the goals set and implementing plans. This function defines the essential connections between people, tasks, and work; it allows you to integrate and coordinate all available resources (time, personnel, logistics, and financial). The control management function provides monitoring of goal achievement. The current interpretation of the function involves comparing standards, norms, plans, and the actual state of the phenomenon. Control must lose its authoritarian and bureaucratic essence. It should take on a new color: humanistic character, optimism, educational and methodological orientation, and transparency and information sufficiency. Quantitative inspections should recede into the background, which are replaced by self-certification. More attention is paid to the results and their quality. Control is also used to encourage successful activities. Regulation is a management function, the essence of which is to correct the consequences of control. This function allows you to maintain the system of an educational institution at an optimal level, organize all subsystems, and avoid excessive reactive control (based on consequences and deviations) [14].

One of the conditions for successful management of the educational process in an educational institution is its information support. Information support of educational

management involves the possession of external information that makes it possible to determine the level of competitiveness of an educational institution, and internal information that reflects the real state of the educational process, and is necessary for making managerial decisions aimed at improving it. [27].

S. Karplyuk, T. Vakalyuk, relying on software for higher education institutions [25] consider such innovative implementations necessary for higher education institutions.

Dean's office software package containing interdependent modules:

1. Curriculum. A program for use in the Educational Department of a college degree. It is aimed at ensuring high-quality creation, editing and calculation of quantitative indicators in curricula, obtaining appropriate reporting documentation, as well as facilitating the formation of the number of vacancies in the teaching load, in accordance with the norms of current legislation. This program provides an opportunity for employees of a higher education institution to determine the hours of consultation, individual and credit classes with their own hands. This also includes hours of tests, exams (oral or written), state certification (state exams or theses), tests (independent, modular, etc.), calculation and graphic works, as well as any other types of workload for all forms of study (full-time, evening and part-time).

2. Educational process (University). A program for use in the Educational Department of Higher Education. Provides reflection in the database of the structure of the entire educational process of the Higher Education Institution, calculation of the load for each department and for the institution of higher education as a whole, registration of data for any category of teachers and employees. Despite this, this program helps to facilitate the distribution of teaching load among teachers, which occurs by automatically calculating the total number of hours for the week, semester and academic year of each individual teacher. This application makes it possible to carry out a comprehensive analysis of the educational process in the entire institution of higher education, as well as generate and print all the necessary documentation: the pedagogical teaching load, the budget of hours for a particular discipline, the total staff of all departments, etc.).

3. Politek-soft (hereinafter PS) – Department-Web. Planning. This app is intended for use by higher education departments. Its work is based on the principles of using a Web interface, which eliminates the need to carry out work on its establishment in the Departments of Higher Education Institution. A special feature of this application is the ability to distribute the entire teaching load of the department among all its members.

4. PS-Department-Web. Execution. The program is designed for use by university departments. As well as the application "PS-Department-Web. Planning", it does not require additional work on its installation in the

Departments of College Degree. It provides an opportunity to record and conduct a complete analysis of the performance of the load of any department during the entire academic year.

5. Schedule. This program is designed to draw up a schedule of training sessions in strict accordance with the curriculum of each specific specialty, the teaching load of all teachers of the Higher Education Institution, as well as taking into account the capabilities of the classroom fund.

6. PS-Student-Web. The directorates of educational and scientific institutes and deans of university faculties use this application. It is based on the use of a Web interface, which, in turn, does not require additional work on its installation on the computers of structural divisions. The purpose of this program is to keep records of students and all current events that are recorded by orders (movement of the contingent, change of last name, etc.), monitor students' academic performance (according to all possible systems for assessing academic achievements). Despite this, among the opportunities of this program is to receive reports on the distribution of students (f. 2-3 of the tax code) and their academic performance (semester and annual statements, academic performance statistics, summary statement for the Diploma Supplement, etc.).

7. PS-Diploma Supplement-Web. This application is designed as an object (Active X) that has the property of automatically loading into the Internet Browser over the network from the server. It provides an opportunity to print appendices to new diplomas in accordance with the current legislation. The principle of its operation is to automatically obtain all the necessary information for printing from the database generated by the PS-Student-Web Program.

8. PS-Akadem. Help-Web. A program that allows you to create and print students' academic certificates. It, based on the program "PS-Student-Web", allows you to automatically get from the database all the necessary information for printing for each specific student. In the Dean's office software package, specialists of Politek-soft LLC, in addition to these modules, have created additional software modules that help expand the functioning capabilities of the PS-Student-Web Program.

Despite the outlined software modules, the package additionally includes the "PS-Administrator" program. Its functions are to conduct daily testing, backup, and, if necessary, restore the entire database.

It provides an opportunity for higher education institutions to save money, since it does not require human resources for maintaining database management systems.

This structure and organization of the Dean's Office software package ensures a high reliability of data storage, as well as their reliability. Despite this, it is worth noting that full information compatibility with other software products PE "Politek-soft" provides high-quality import of data that has already been entered in the database of other products. [5].

The automated management system of an educational institution allows: to provide management subjects with pedagogically appropriate and useful for the management of an educational institution with the content of information, the necessary amount of adequate, operational, relevant, valuable, up-to-date information about the state and development of processes in all structural divisions of the school; access of user subjects to the data bank; quickly and efficiently perform statistical reports on various aspects of the educational institution's activities; solve managerial, pedagogical, accounting tasks; streamline and reduce information flows in the organizational structure of the educational institution; maintain documentation; transmit data in electronic form to educational management bodies of various hierarchical levels; carry out constant exchange of information and electronic document flow between the structural components of the educational institution; it is rational to organize the activities of managers – subjects of the educational process of an educational institution by reducing the time spent searching for the necessary information and increasing the level of analytical activity.

In the conditions of the information society, the priority becomes the information and analytical activity of the manager of an educational institution, which is characterized by an increase in the number of types, sources, and flows of information, constant updating of its content, and the implementation of a number of sequential actions on information, that is, information processes. According to the results of the study, it was found that the low level of information support for the management of an educational institution is explained by the lack of computer support for the processes of receiving, processing and storing external socio-pedagogical information. This is stated by 78% of respondents-heads of educational institutions. [27].

The application of the process approach in the quality management system for training future specialists involves modeling the network of processes that make up the activities of a higher education institution. At the same time, all the processes of a higher education institution can be divided into management processes; the main processes, the direct result of which is the provision of educational services; auxiliary processes, the result of which is the creation of the necessary conditions for the implementation of the main processes; the processes of measurement, analysis and improvement. The success of a higher education institution and consumer satisfaction depend precisely on the main processes that play a major role in relation to other processes. The main processes are strategically important for the success of the organization, related to the creation of products (services), affect customer satisfaction, and contribute to the implementation of the organization's mission.

Modeling of the quality management system for training future specialists in a higher education institution can be defined as the process of building a model that reflects the

properties, relationships, structural and functional characteristics of managed processes that are essential from the point of view of implementing management decisions. At the same time, the model provides new useful information in the management system in terms of the task set, the study provides for the possibility of verifying its validity [24].

For the modern educational system, the issue of defining scientifically based criteria for evaluating the quality management of education in a higher education institution is of particular relevance. The criteria determine the direction of organizational and methodological measures, as well as set the limits of what is possible for choosing the quality and scale of the manager's actions. A criterion is a feature that is used to evaluate, define, or classify a phenomenon, process, or activity. Without the formulation of criteria, the work on improving management is already uncertain from the very beginning: what signs determine how well the choice of management option is made under specific conditions [29]. To diagnose the effectiveness of work, it is necessary to develop a system of criteria that will allow monitoring the correctness of management decisions [26].

Education in a higher education institution contributes to the development of a person's creative abilities, expands his worldview, and allows him to join the cultural achievements of humanity. In this regard, the role and importance of all components of cultural policy related to the development of education are objectively increasing. Updating the education management system involves changing the essential properties of its elements, the relations between them, as well as the emergence of new integration qualities.

State regulation of the development of education in Ukraine is a component of the state policy in the field of culture, which is a complex regulated set of relations on the organization and management of educational institutions, which is established between public administration bodies and cultural workers, institutions engaged in the creation, distribution and transfer of cultural values. The main goal of state policy is to promote the satisfaction of the spiritual and cultural needs of citizens and ensure the harmonious cultural development of the nation.

Modernization of educational activities in the educational sphere should be aimed at creating a new system of values based on humanism and aesthetic education, and contribute to meeting the needs of various social groups in cultural development [26].

Conclusions and perspectives

Improving competitiveness, working on improving the quality of all types of educational services, developing long-term partnerships with educational institutions of various

levels and profiles of training allows us to realize scientific and educational potential, identify the most effective ways to overcome the difficulties facing the Educational Complex today, and take a fresh look at already formed management decisions. A balanced approach to analyzing the tasks of improving the effectiveness of educational process management in higher education makes it possible to combine the most valuable practical developments that have emerged on the basis of many years of experience in developing secondary and higher professional education programs. Thus, one of the main conditions for optimizing the strategic planning system of higher education institutions is a target orientation to achieve maximum economic efficiency and effectiveness, as well as taking into account the disadvantages and advantages of strategies for integrating educational and research institutions within the scientific and educational complex to carry out joint activities taking into account the interests of all participants in the educational process [15].

The article reveals the content of managing the educational process by means of information technologies for high-quality training of specialists in higher education institutions. The main components of the quality management system of personnel training in higher education institutions are highlighted. The strategy of higher education institutions is marked out. The content of the main concepts of the study is justified. The main components of the quality management system for training personnel in higher education institutions are listed. The analysis of management functions that play a central role in the development of an educational institution is presented. Software for higher education institutions is presented and the advantages of an automated educational process management system for high-quality training of specialists in higher education institutions by means of information technologies are shown.

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