

Quality management system of professional training of students on the digital technology basis

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Abstract. The role of digital technologies in education is increasing. Digital technologies are characterized by both positive and negative effects. But everyone sees that digital technologies lead to a radical change in socio-economic reality and open up new opportunities. It is necessary to have knowledge and skills of working with modern digital technologies and use them in the professional training of students. The methods of our research are content analysis of scientific literature on the problems of quality management of professional training and modern digital technologies in the education system, observation, training in a remote mode, and a survey of students on the use of digital technologies in the process of distance learning. The development and use of distance learning technologies in the system of professional training of students involves: determining the sequence of operations; development and selection of appropriate methods and tools for each operation; creation of optimal conditions for the learning process. It is difficult to describe the algorithms of the quality management system of professional training and determine the set of methods of realization that make up the management process, but it is possible with proper training of teachers. Digital technologies make it possible to increase the computer literacy of the teaching staff, to update its creative potential, to include teachers in innovative activities related to the search for technologies for managing the quality of professional training of students in a blended educational environment.

1 Introduction

The role of digital technologies in the education is increasing. Digital technologies are characterized by positive and negative effects. But we can see that digital technologies lead to a radical change in socio-economic reality and lead to new opportunities. Digital technologies are especially relevant at the present time, when the risk of spreading coronavirus is increasing. It is necessary to have knowledge and skills of work with modern digital technologies. It is necessary to use the positive effects of digitalization. Digital technologies provide an opportunity to improve the computer literacy of the teaching staff,

to update its creative potential, to include teachers in innovative activities, related to the search for technologies for the quality management of professional training of students in a mixed learning environment.

2 Methods

The methods of our research are content analysis of scientific literature on the problems of quality management of professional training and modern digital technologies in the education system, observation, training in a remote mode, and a survey of students on the use of digital technologies in the process of distance learning.

3 Results and findings

The problems of quality management of professional training were studied by E. P. Velikhov, M. G. Gelfman, M. G. Minin, I. V. Robert, V. A. Starodubtsev, etc. Problems of informational and management information-educational environment are discussed by Yu. G. Korotnikov, O. Ilchenko, J. N. Zaitseva, V. I. Soldatkin, V. V. Gura, B. P. Saikov etc. The phenomenon of digitalization in scientific contexts was considered by such authors as: M. A. Stepanova, V. G. Fedotova, A. L. Nikiforov, M. M. Shulman, D. V. Efremenko, M. N. Kuzmin, O. V. Letov, B. G. Yudin, V. G. Gorokhov, A. O. Karpov, S. A. Lebedev, A. I. Rakitov and others Yu.S. Bortsov,

D. L. Konstantinovsky, G. E. Zborovsky and others.V. A. Lukyanenko and V. S. Fedorova proved the necessity of an activity-based approach to digitalization of education. Psychological and pedagogical foundations of the use of information technologies in education are considered in the works of A. G. Asmolov, V. P. Bespalko, V. M. Monakhova, E. S. Polat.

Current research trends in the field of learning in the digital educational environment are based on the works of V. I. Baydenko, V. A. Bolotov, I. A. Zimnyaya, M. G. Minin, Yu. G. Tatur, A. V. Khutorskoy, V. D. Shadrikov [1].

Management technology is defined as a system of step-by-step procedures and operations performed by specialists and managers in a certain sequence. The introduction of new management technologies aims to optimize the management process by eliminating such activities that do not affect the achievement of the planned result. The concept of "technology in a control system" is closely related to the process of algorithmizing of actions or operations. The role of the algorithm in the management process is played by requirements that fully determine the content and sequence of actions in any organizational process. This process can be decomposed into subprocesses and implemented through sequential execution of operations [2].

Schematically, the technology in the quality management system can be represented in the form of three main cycles (processes). Information process: search, collection, transmission, processing of information. Logical process (the process of developing and making decisions): research, processing, calculations, forecasts, decision-making. Organizational process: recruitment, operational planning, organization of activities, coordination, control [2].

The effectiveness of the technology in the management system is the final result, which is expressed in saving time and material resources. The criteria for the effectiveness of technology in the management system include: simplicity (the technology should not be complex, contain intermediate stages); flexibility (adaptability to changing conditions); cost-effectiveness (the technology can be effective, but not economical) [3].

The concept of technology in the quality management system of professional training of students is not generally accepted in traditional pedagogy. We believe that technology in the quality management system of professional training of students is a complex of methods of planning, organization and control of teaching and learning with using interaction logistic and human resources to optimize the educational process.

The use of only one technology in the quality management system of professional training of students is unacceptable. After all, the conditions for the use of certain technologies and their combinations depend on many factors: the level of training of students; the experience of the teacher; the technical equipment of the educational process; the number of students in the group, etc.

In theoretical terms, the issues of methodological management of students' educational activities continue to be developed. It represents a system of methodological, psychological and pedagogical tools necessary to ensure the quality of the educational process. Tools are components of the system which are used to perform transformations of control objects. The environment in which learning takes place can be considered as a means of forming the individual's experience [4].

Today we are talking about creating an educational environment in the context of distance learning. Of course, the computer itself does not solve the problem of the training and does not increase it. First of all, it is necessary to solve the psychological and pedagogical problems of distance learning. The computer as a learning tool is one of the components of the modern didactic system: goals, content, forms, methods, activities of the teacher and student. These components are connected, and a change in one of them causes a change in all the others. First of all, the activity of students and teachers in distance education is changing.

In general, distance learning technologies contain a huge motivational potential, which is of great importance in quality management system of professional training of students. The main aims of the use of distance learning technologies in the quality management system of professional training of students are: the formation of metasubject educational results (skills to work with information, the development of communication skills); training of a professional of the new information society; the formation of research skills, etc. [5]

Conceptual features of distance learning technologies in the system of quality management of professional training of students are: the adaptability of computer programs to the individual characteristics of each student; creating a psychologically comfortable environment in class; a variety of types of interaction between students (student - student, student - students, student – teacher, students-teacher) [2].

The use of digital technologies in the quality management system of professional training is based on a number of principles [6]. The principle of hierarchy, because the management of the system is built on a hierarchical principle. In this hierarchy, the teacher takes a leading position, creates the information field of the subject, provides individual assistance in non-standard situations, corrects and controls.

The feedback principle requires a cyclical organization of the educational process. Both the teacher and the student need feedback, which serves to correct the results of students.

The principle of individuality is based on the fact that the student's work with the computer is individual and provides an opportunity for each student to advance in learning at an individual speed, taking into account his intellectual capabilities [7].

The principle of a step-by-step technological process. Step-by-step work with educational material is a technique that presents the material in separate parts. Each "step" includes three links: information, feedback operation, and control.

Digital technologies or distance learning technologies in the system of professional training of students give opportunities to organize dialogical communication with each student, as well as to study the material at an individual pace. A positive aspect of the use

of digital technologies or distance learning technologies in the quality management system of professional training of students is that a computer can guarantee confidentiality. The student knows the mistakes that he has made, there is no fear of mistakes. Also, the computer is able to provide interactive learning to a greater extent than classroom work [15].

Discussion. Digital technologies or distance learning technologies in the professional training of students have as supporters as opponents. Some educators have expressed concern that the computer creates a barrier between the teacher and the student. Other teachers note that a computer saves time, but live conversation, especially in a foreign language, is more important for students. Therefore, we propose to consider the advantages and disadvantages of information technologies [11].

The benefits of the digital technologies or distance learning technologies include the following: individualization of learning; developing independence; the lack of a sense of fear at the wrong answer; facilitates learning; relaxation of the students in the process of cognitive activities; formed constructive thinking; it is carried out stepwise management of educational activity; operational feedback is provided; effective training in self-control, self-management and correction of educational activities takes place [7].

The disadvantages of the digital technologies or distance learning technologies include: the decline (and in some cases elimination) of group learning, which reduces developmental and educational potential of education; weak development of creative activity; a reduction of direct influence of teacher, and the possibility of communicating students with each other; the impossibility of the intellectual and emotional impact of the teacher to the student; the pedagogical process is not only training but also personality development; the displays are harmful for health [5].

In work distance learning technologies, the teacher can use three main programming systems of educational material: linear, branched and mixed (combined). In a linear program, the material is served in small portions, which are consistently (linearly) presented for study. After completing the task, the student receives the keys for self-control and self-correction [3].

The use of a branched program involves the introduction of additional explanations when students make mistakes or do not know the answer. The sequence of presentation of new material changes and depends on the result of the previous task. If the task is completed correctly, the student can start studying a new portion of the material, if mistakes are made in the task, he does additional, easier exercises. Only if the tasks are completed correctly, the student can return to the starting position. After successful completion, he will be able to move on to mastering a new portion of the educational material.

The programs are sometimes combined to form a new type, called a combined program.

The use of distance learning technologies develops the idea of a programmed method. It opens up completely new, not yet explored technological options in the quality management of professional training of students associated with the unique capabilities of modern telecommunications. Modern multimedia systems allow us to include in the process of teaching significant and diverse information: a video sequence, video fragments, dynamic diagrams, design electronic textbooks [14].

Another means of managing students' learning activities is the educational and methodical complexes in electronic form. They contain a variety of educational and methodological materials necessary to ensure professionally-oriented independent students' work [9], [12], [13]. One of the most important components of the educational and methodical complexes in electronic form is a e-textbook. The e-textbook is intended for the management of independent educational activities of students in the process of assimilation of the content of the course. Such e-textbook can provide: the organization of independent work of the student, including training and self-control of knowledge, training grant a

required educational program material; methodological support of the learning process; an extra learning support for the educational program. Didactic requirements for the e-textbook the following: scientific depth, accuracy, and reliability of presentation of the content of educational material with the latest scientific achievements); accessibility that means the necessity of determining the degree of theoretical complexity and depth of learning material according to the age and individual characteristics of students; problematic as determined by the nature of educational and cognitive activity; the visibility that requires account of sensory perception of the studied objects; the regularity and consistency that means ensuring the consistent learning by students; methodological orientation that provides cognitive, heuristic, research and prognostic functions in student activities; practical orientation that means the disclosure of practical use of the studied material in real life [3].

4 Conclusion

Today, distance learning technologies are used at all stages of learning: when introducing new material, consolidating, repeating, and controlling knowledge and skills. For the student, the computer serves as a teacher, a working tool, a learning object, an interactive and leisure (game) tool. In the function of the teacher, the computer represents: a source of information; a visual aid; a simulator; an individual information space; a means of diagnosis and control. In the function of a working tool, the computer acts as: a means of preparing tests; text and graphic editor; constructing classes. The interactive environment is created by the computer as a result of communication with a wide audience. The leisure environment is organized with the help of game programs [8].

The work of the teacher with the distance learning technologies in the professional training system has a number of functions: organization and management of educational process in the classroom (curriculum, external diagnosis, final control); organization and management of classroom work through the activation and coordination (coaching); individual monitoring of students, providing individual advice; preparation of components of the information environment (software tools and systems, educational and visual aids), their connection with the subject content of a particular training course.

So, the development and use of distance learning technology in the system of professional training of students involves: determining the sequence of operations that make up the management process; developing and selecting appropriate methods and tools for each operation; creating optimal conditions for the process of teaching and studying. But to describe the algorithms of the quality management system training and define a set of methods of execution, ordering the information and interactions that make up the management process is difficult, but possible with proper preparation and readiness of teachers.

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