MAIN TECHNOLOGICAL TOOLS FOR DEVELOPMENT OF PROFESSIONAL COMPETENCE OF FUTURE ENGINEERS

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Abstract. In the process of informatization of education, several technical and technological tools can be used in the lessons organized to develop the professional competence of future engineers. The tool used in the lessons makes it easier to achieve the goals of the lesson. This article discusses the importance of using tools in the training sessions organized for the development of the professional competence of future engineers and the advantages of using innovative technologies during the training process.

Key words: lesson planning, lesson process, technological tools, technical devices, smart board, touch displays, competence, mobile devices, interactive board

Today, all aspects of life cannot be imagined without information technologies. In particular, every house has a TV or a computer, and it is very difficult to imagine a person who does not use the Internet. Rapidly developing science and technology introduced the concept of informatization to all social systems and structures existing in society. The development of technology has led to informatization of society [1].

In turn, the educational system has not been left out of the information process. Informatization of the educational process could not be carried out without information tools. Educational informatization tool means computer equipment, software and support used as a tool for teaching in the educational process.

We can divide educational information tools into eight groups. The following are considered as the main means of information:

Tools for recording and listening to audio and video;

Radio equipment;

Television equipment;

Projector and film equipment;

Computer programs;

Electronic manuals and textbooks;

Telecommunications and teaching tools;

Electronic board and touch screens.

As mentioned above, the use of computers in the educational process leads to the informatization of education. Therefore, informatization of education requires extensive use of computers in the educational process.

The computer is the main tool for the information of the educational process. During the training process, the teacher can provide the necessary information during the lesson by using the router.

At this point, in the conditions of information, electronic textbooks and manuals serve as a basic means of information. When we talk about educational information technologies, we should focus on electronic textbooks and electronic training manuals. Because with their help, future

engineers can master the educational materials much better. The main reason for this is that the materials can be stored not only in text form, but also in electronic form.

Electronic sensor displays, which are considered as an innovative technological tool in the context of educational informatization, are one of the convenient tools for the process of educational informatization today. Because with these modern devices, it is possible to perform the tasks of all the technical means of educational informatization listed above, and they can be used as a technical tool in the use of all software and informatization tools. Electronic sensor relays can be used for the following purposes:

To download and listen to sounds and videos;

Can be used as radio or television equipment;

It can act as a projector and optical film equipment;

Telecommunications as a teaching tool;

Electronic manuals and textbooks can be used to demonstrate to a future engineer.

Electronic sensor displays are usually known to us in two forms. The first type is devices with a small-sized sensor screen. As an example of this device, we can cite tablet. As a technical means of information, tablet also belongs to the category of "Telecommunications and teaching tools". But we cannot include large-sized electronic sensor displays in this group. This device is more perfect and combines the functions of visual educational tools, so it is appropriate to consider it as a separate type of educational tool.

The fundamental changes taking place in the field of education in our country require the development of methodological support of the educational process in every educational institution. Modern information and communication technologies have become the main source of editorial innovations in recent years.

One of the necessary conditions for improving the content of education is to increase the opportunities for students to learn independently, to create the necessary conditions for the formation and development of electronic information resources of education.

In today's modern education, high-quality and high-quality technology is the basis of the system. Its implementation and development is technically complex, but this environment serves to improve the educational system, to introduce information and communication technologies into the educational process. In order to ensure the education of the new generation at a high level, the creation of electronic methods and manuals for all subjects is one of the issues of state importance [2].

Currently, the rapid development of knowledge in all fields of science, in which science is rapidly developing, sets the task of acquiring knowledge regularly and independently, along with rapid and high-quality assimilation of knowledge, in a modern society with widespread use of information and communication tools. Therefore, the issue of educating people with sufficient intellectual capacity, who can think independently and observe based on the modern achievements of science, as well as training competitive, highly qualified personnel, requires the creation of a new generation of electronic methods and manuals.

As one of the main goals of the "Concert for the creation of the next generation of educational literature for the continuing education system" developed on the basis of the state education standards, which are in line with the requirements for modern personnel, the science for the development of electronic methods and manuals. - To clarify the psychological, editorial and methodological requirements, to provide accurate definitions of their existing forms and types in order to use electronic methods and manuals correctly and rationally, and to promote modern

electronic methods and manuals at the national level. it is determined to determine the scope of strategic issues.

Authors should pay attention to the following when creating an electronic manual, electronic recommendation or instruction intended for practice and lecture classes:

- to discuss the electronic method and manual with experienced practical and lecture teachers in order to determine the existing methods;

- to take into account the level of skills, intellectual abilities and cognitive abilities of the future engineering team of the existing technical higher education institutions in our republic in the preparation of the electronic method and manual intended for classes;

- that the language of electronic methods and manuals corresponds to the characteristics and worldviews of future engineers;

- taking the topics included in the curriculum of the subject as a basis for creating the content of the electronic method and manual;

- the practical and live tests, test questions presented in the electronic manual encourage future engineers to be active, to interpret the information given without being limited to providing information, to encourage future engineers to think creatively, to focus on specific goals and tasks, educational must have a number of specifics, such as being related to the subjects included in the plan.

In the process of working with the electronic educational method and instruction manual intended for classes, authors are recommended to follow the following requirements:

- practical and lecture classes are based on this science program included in the model curriculum of higher education institutions;

- coverage of the latest achievements of this science;

- use of the developments designed for the lessons of this subject by foreign authors in this field;

- for the future engineer to be able to independently evaluate himself, the database of tests included in the electronic test programs should be equipped with test questions (examples and problems) showing the result;

- to be provided with decorations, images and drawings that encourage learning;

- there should be recommendations for the areas of independent development of knowledge and educational practical literature.

The methodological requirements of the electronic method and manual are based on the characteristics of the science, and the characteristics of the implementation of innovative methods of research methods, research and information processing. Electronic methods and manuals for academic subjects must meet the following methodological requirements:

- electronic method and manual - construction based on the interdependence of conceptual, figurative and moving elements of presentation of educational material;

- electronic methods and manuals provide educational material in the form of a well-ordered structure. Consideration of interdisciplinary logic and interdependence;

- in electronic manuals, it is possible to determine whether the user has mastered the educational material step by step, based on the implementation of various controls

The stages of creating electronic methods and manuals are as follows:

Stage 1. Assessment.

Before using electronic methods and manuals, the user must answer the following questions:

- what kind of electronic methods and manuals should be published and it is intended for what specialties;

- getting acquainted with the approved educational program and determining the amount of allocated hours;

- who will benefit from electronic methods and manuals and their specific goals;

- taking into account the age and level of students who use the guide;

- getting acquainted with electronic methods and manuals related to science and electronic methods and manuals from other subjects, determining their requirements and criteria.

A team of authors will be formed to create an electronic manual. The team of authors includes a science teacher, specialists in the field, developers of the State Education Standard and science programs, programmers and designers, methodologists.

At the initial stage, the distribution of work among the authors is determined. The plan for the implementation of the electronic method and manual will be developed in cooperation with the authors. The quality of the published e-learning method and guide depends on the editorial and professional skills of the authors, their level of knowledge.

Stage 2. Defining goals

In order to choose the right goals, the following questions should be asked:

- What electronic methods and manuals are used in teaching educational courses?

- what kind of knowledge and skills will the user of the electronic method and manual have after using it, and what should they be able to do? (how can a learner acquire professional qualifications by using the manual?);

- What will be the content and structure of the electronic manual? (Remembering the idea and basic topic together with clear concepts, terms, definitions, rules).

Stage 3. Studying available resources to improve the content of the electronic method and manual.

In order for the electronic method and manual to be meaningful, it is necessary to use sufficient scientific data, theories explaining the content of the manual, and separate sources available today. To achieve this, the team of authors will have to study the available sources.

Step 4. Development of the structure of the electronic manual.

Building the structure of the electronic method and manual on the basis of a system makes it easier to achieve the goal. An electronic resource aimed at forming creativity in students, which ensures the development of competence, knowledge, qualifications and skills, the achievement of independence in education and the conduct of control types, based on the requirements set by the electronic method and manual includes teaching-methodical materials, didactic resources and tools.

The electronic manual includes mandatory and additional parts. The mandatory part consists of 4 components: the component of mandatory documents; basic content-determining component; methodological component; evaluation component. An electronic catalog, electronic journals, links to Internet sites, etc. can be included in the supplementary part of the electronic manual.

At this stage, the content of the electronic method and manual is created and planned. It is usually divided into two: topics and topic content planning.

a) planning topics - determining the general structure and structure of the electronic method and guide, and based on it, creating a list of sections and its parts;

b) planning the content of the topics - making a list of the parts of the topic and fully understanding their basic content.

Step 5. Formation of the basic materials of the electronic method and manual.

The procedure part contains all the procedures necessary to reveal the content of the part. Texts and materials published for electronic methods and manuals are revised two or three times:

Initial option (A1) – initial text and option scheme for the internal content of the topics. Its content and structure will be shown to other experts and their opinions will be studied.

The second option (A2) is a modified form of the first option. Usually, this option is tested within a certain period of time.

Version (A3) is the latest version of the electronic manual.

Step 6. Editing.

All information on the topic is organized and collected based on the plan. During the editing of the networked materials, general comments and redundant information are deleted and the opinions are summarized. The final variant is usually edited in two ways:

Content editing. Changes are made to the content of the text and the system of the electronic manual by an expert - a reviewer or a specialist with deep knowledge of this field.

Technical editing. Technical improvement of the electronic method and manual, providing a beautiful interface, i.e. the shape, size, sequence of the content of letters, commenting on images, comprehensibility of diagrams and tables, multimedia - compatibility with voice and other necessary aspects will be edited. Creators of electronic methods and manuals should try to reduce the need for technical editing as much as possible, so the process of technical editing will be delayed.

Step 7. Electronic methods and manuals are available for download.

Before submitting the electronic method and manual to the public, aspects of the effectiveness of the manual are studied in practical experience, and discussed in scientific councils. At this stage, the electronic method and manual will be transferred to the user. The advantage of using an electronic manual in the educational system is that the user is provided with the necessary information at a convenient time. A team of authors (specialists) produces better electronic methods and manuals than an individual author. If it is decided to work as a group in the creation of electronic methods and manuals, they must take into account the following:

- meet frequently to exchange ideas;
- making important decisions together;
- distribution of tasks logically and at the level of possibilities;
- setting deadlines and strictly following them;
- determining the form and content of topics and sections and making decisions to maintain a uniform style.

In conclusion, in order to develop the professional competence of future engineers based on innovative technologies in the conditions of informatization of education, it is necessary to develop educational tools that are preferable to traditional educational tools. In this sense, the advantages of using interactive touch displays in the organization of lessons in the conditions of educational informatization were scientifically substantiated and the teaching methodology was presented. In order to develop the professional competence of future engineers in the conditions of informatization of education, the steps of creating electronic educational resources were studied.

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