USE OF VISUAL MODELING IN FORMING PROFESSIONAL COMPETENCE OF STUDENTS OF THE SPECIALIZATION USE OF HYDROTECHNIC INSTALLATIONS AND PUMPING STATIONS

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Abstract

This article deals with the analysis of the phenomenon of the model in pedagogical research. According to the definitions given in some dictionaries and reference books, the model is understood as an abstract representation of some kind of reality. Models can be of various types. In the context of this study, the main attention is paid to the model. It is observed that modeling is becoming one of the relevant methods of scientific and pedagogical research at the present time.

Keywords: 3D technologies, distance learning, graphic visualization of electronic educational publications, visualization graphic visualization method, didactic features, principles of development of electronic educational publications, etc.

Introduction

The most important thing in developing a model is the choice of its principles. In the context of the research, the following principles of modeling are considered in our research work:

- consistency and equivalence, that is, the model must meet the requirements of modern theoretical and methodological paradigms imposed on higher education;
- accuracy, that is, the model must determine the compliance of the results with the established goals and objectives;
- universality, the model is based on the basic principles that can be transferred to the educational environment of any educational institution.

The purpose determines what methods to use in solving the tasks, what software environment to choose, and how the research results will be reflected.

Analysis of literature on the topic

V.D. Shadrikov noted that the purpose of this model is to create pedagogical conditions for the formation of professional competencies of bachelors in the field of service provision in the educational process in technical higher educational institutions. This competency provides the opportunity to effectively carry out professional activities on the basis of information technologies.

Its tasks are as follows:

- analysis of the training of future engineers in the field of service provision using a competency-based approach and graphical visualization methods in the context of informatization of the educational process using 3D technologies;
- justification of the effectiveness of applying the model to the educational process and its use.

The component of the model reflects the design of the content of this training. The design of the content of subjects in the conditions of pedagogical experimental work to be carried out is carried out on the basis of the following principles: fundamentality, practical orientation, continuity, sectoral character, continuity.

As a result, this research work describes each principle of selecting the content of training future engineers in the service sector using graphical visualization and 3D technology methods.

Research methodology

The principle of fundamentality is associated with rapidly changing information technologies, changing the requirements for the professional training of engineers;

The principle of practical orientation of educational content is ensured by a combination of theoretical, scientific and practice-oriented knowledge, that is, the development of specific software products for the study of information technologies and their use in professional activities.

The principle of continuity of education is associated with the constant enrichment of the knowledge system and the acquisition of independent learning methods by students.

The principle of network nature is ensured by the implementation of educational needs at any time, anywhere, both during study in technical higher educational institutions and in the process of independent learning.

The principle of continuity implies consistency between the goals, content, methods, forms and means of education.

Analysis and results

In the context of our research work, the component of training engineers in the field of service using graphic visualization and 3D technologies is based on knowledge in the field of engineering and computer graphics.

In addition, the formation of professional competence in the future requires knowledge of solving micrometric state problems, etc.

The component of the model for the formation of professional competence of bachelors in the field of service using graphic visualization, 3D technologies and distance learning methods provides completeness and variability of knowledge that ensures the unity of professional, information and communication education. In this regard, the future engineer in the field of

computer graphics acquires the following knowledge in the field of computer graphics: methods of using software and technical means of computer graphics, the use of various color models, the use of techniques for creating vector primitives, techniques and tools for working with raster graphics, the basics of working with 3D primitives, the development of skills in working with special literature, reference books, etc.

This content helps to form the cognitive component of professional competence identified in our research work, namely:

in the field of information and communication technologies;

- in the field of computer modeling;
- in the field of engineering graphics;
- in the field of computer, interactive graphics and ALT;
- knowledge of working with color, choosing harmonious shades, using the necessary file formats and graphic information processing packages in general.

Here it should be noted that the content of the training should contribute to the motivation for the constant pursuit of mastering professional engineering knowledge and skills, and learning information technologies.

Electronic courses that are relevant today. In modern education, an electronic course is a didactic system, with the help of which the educational process is carried out using information and communication technologies. Some researchers note that an electronic course consists of certain work blocks: information, control-communicative and correction-generalization, which allows you to fully present the content of the subject, its sections, topics and control the implementation of tasks, including control questions; questions for exams and tests, an algorithm of assessment criteria.

In distance education, game technologies are often used in the following: teaching, learning, control and generalization: cognitive, educational, developing; reproductive, productive, creative; communicative, diagnostic, career guidance, psychotechnical and other similar types of pedagogical games.

The content of the study focuses on the use of distance learning technologies in organizing independent work of students, these technologies are based on the use of new information, telecommunication and traditional technologies and technical means.

The evaluative and effective component of the model for the formation of professional competence of bachelors in the field of service using graphic visualization, 3D technologies and distance learning methods is organized in accordance with its structure and includes the following levels of their formation: high, average, low.

Based on the specified criteria for obtaining reliable data, we determine the level of formation of each component of professional competence in our research work.

The motivational component of the professional competence of future service engineers is considered to be a high level of formation of the motivational component of professional competence.

Students at this level are motivated to engage in professional engineering activities and the use of information technologies in educational activities. They are encouraged to understand the importance of professional knowledge in terms of skills and competencies, they constantly strive to learn about information technologies and the motivation for sustainable achievements. Future engineers have a developed need for self-understanding, professional success, and improving their professional level through the use of information technologies.

Average level of formation. It is a motivational component of professional competence.

Respondents at this level are usually motivated to engage in professional engineering activities, but they are not motivated to use information technologies in their educational activities. They are usually motivated to understand the importance of professional skills, they have a constant desire to learn mainly information technologies and a motivation for sustainable achievements. Future engineers, in general, have developed a need for self-realization, professional success, and improving their professional level through the use of information technologies.

Low level of formation of the motivational component of professional competence. Students at this level do not have a motivation for professional engineering activities, they are not motivated to use information technologies in their educational activities. They do not show motivation to understand the importance of knowledge of professional skills, they do not have a constant desire to learn information technologies and a motivation for sustainable success. Future engineers do not have a developed need for self-realization, professional success, and improving their professional level based on the use of information technologies.

Cognitive component of professional competence. Represents a high level of formation of the cognitive component of professional competence.

Respondents at this level, who are meaningfully "excellent", have knowledge in the field of information and communication technologies.

They have mastered computer modeling. Respondents at this level have excellent knowledge in engineering, computers, interactive graphics, and ALT.

They attach personal meaning to the knowledge of working with color, selecting harmonious shades, using the necessary file formats and graphics processing packages.

This is the average level of formation of the cognitive component of professional competence. Respondents at this level have good knowledge in the field of information and communication technologies. Respondents at this level have good knowledge in engineering, computers, interactive graphics, and ALT. They usually have mastered the knowledge of working with colors, choosing harmonious shades, using the necessary file formats and graphics processing packages, but are not interested in additional information.

Low level of formation of the cognitive component of professional competence. Respondents at this level have satisfactory knowledge in the field of information and communication technologies. Respondents at this level have satisfactory knowledge in engineering, computers, interactive graphics and ALT. They have not mastered the knowledge of working with colors, choosing harmonious shades, using the necessary file formats and graphics processing packages.

It is an activity component of professional competence.

It represents a high level of formation of the activity component of professional competence. Students at this level have acquired the following skills: using Internet services in information processing; determining the position of a point and a straight line relative to the projection planes in different octants. They are able to solve positional and metric problems "excellently"; independently use the acquired skills in working with graphic objects using graphic editors to create the most widely used graphic models of geometric bodies and surfaces in modern engineering, create innovative projects in the field of service provision and solve practical practical problems.

The average level of formation of the activity component of professional competence.

Students at this level have acquired the following skills: using Internet services in information processing; determining the position of a point and a straight line relative to the projection planes in different octants. They are able to solve positional and metric problems "excellently"; They acquired skills such as creating graphic models of geometric bodies and surfaces that are most widely used in modern engineering, creating innovative projects in the service sector, and using independently acquired skills in working with graphic objects using graphic editors to solve practical problems.

Conclusions and suggestions

Low level of activity of the component of professional competence. Students at this level have not mastered the skills: Use Internet services in information processing; Determine the point and straight line relative to the projection planes of projectors in different octaves.

They find it difficult to use tools and various color models; Select color shades and color combinations; Make changes; Create and edit graphic objects and graphic data in general. They have no skills: use various graphic editors in the construction of graphic objects; in the creation, adjustment and design of several images; use independent skills in working with graphic objects using graphic objects in the creation of innovative projects in the provision of services and solving practical practical problems.

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