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DIDAKTISCHE MÖGLICHKEITEN DES UNTERRICHTS ALLGEMEINER FÄCHER AUF DER BASIS VON SOFTWARE-LEHRWERKZEUGEN

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Anmerkung: In diesem Artikel werden die Methoden der allgemeinen Berufsfachdidaktik und deren Umsetzung im Einklang mit den Ansätzen zur Verbesserung allgemeindidaktischer Lehrmethoden diskutiert. Darstellung von Daten mittels digitaler Technologien und dient der übersichtlicheren und einfacheren Darstellung. Der Nachweis der Problemlösung wird durch die Verwendung von Software-Trainingstools vereinfacht, um ein vollständiges Verständnis des Problems durch die Schüler zu erreichen und ihnen beizubringen, Probleme selbst zu lösen, um kreatives Denken und Kreativität zu entwickeln. Eine der wichtigen Aufgaben ist es daher, die didaktischen Möglichkeiten des Lernens mit im Bildungsprozess eingesetzten Software-Lernwerkzeugen zu berücksichtigen.

Stichworte: Lernsoftware, Prozess, Dialektik, konstruktive, digitale Bildung. Technologien, abstrakt, Modellierung , interaktiv. Physik, Wärme, Energie.

DIDACTIC POSSIBILITIES OF TEACHING GENERAL SUBJECTS ON THE BASIS OF SOFTWARE EDUCATIONAL TOOLS

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Abstract: This article discusses the methods of teaching general professional subjects and their implementation in accordance with the approaches to improving general didactic teaching methods. Representation of data using digital technologies and serves to present them in a clearer and simpler way. The proof of problem solving is simplified through the use of software training tools, to achieve a complete understanding of the problem by students, and to teach them to solve problems on their own, this is to develop creative thinking and creativity. Therefore, one of the important tasks is to consider the didactic possibilities of learning using software learning tools used in the educational process.

Keywords: learning software, process, dialectic, constructive, digital education. technologies , abstract , modeling , interactive. physics, heat, energy .

Introduction. Today, in the development of society, there is a great need to train students of technical universities as specialists, to form their theoretical knowledge and practical skills, free-thinking personnel capable of independently solving professional and life problems. In this regard, teaching methods are of great importance in the development of knowledge and independent thinking in technical universities.

Demonstration methods are also of particular importance in ensuring the quality and effectiveness of education. The need to use demonstration methods is seen in the fact that it is advisable to follow the principle of learning. 30% of the volume of the

human brain is made up of neurons that provide vision and only 3% of hearing. According to the results of pedagogical and psychological research, 85% of the knowledge acquired by a person is acquired with the help of visual receptors.

The demonstration method is useful in revealing the dynamics of the object under study and at the same time is widely used to obtain complete information about the external appearance and internal structure of the object. When depicting natural objects, attention is usually paid to their appearance (shape, size, quantity, color, parts, their relationships), and then to the study of their internal structure or features. A demonstration is often observed with the help of an object or a drawing of the object being studied. Demonstration of experiments is carried out by drawing on the blackboard or demonstration by the teacher using special equipment, which makes it easier to understand the principles underlying this experiment.

Demonstration of objects, phenomena or processes in their natural state gives a greater didactic effect, but such a demonstration is not always possible. Therefore, professors and teachers turn to the artificial environment when demonstrating natural objects (for example, familiarization with machines at manufacturing enterprises) or use artificially created objects (model, model, mannequin, skeleton, etc.).

Using this method, professors and teachers should guide students in the process of active learning to independently study subjects, carry out the necessary measuring work, establish relationships, and also understand the nature of events. The effectiveness of the demonstration largely depends on the ability of the professor-teacher to choose the right demonstration material in accordance with the student's level of preparation and to direct his attention as much as possible to the important aspects of the subject being demonstrated.

Although the method of representation (illustration) is closely related to the method of demonstration, it is studied separately in didactics. Illustration requires the depiction of things, events and processes with the help of their symbolic images - a drawing, a port, a picture, a photograph, flat models, etc.

Display methods and images are used in a complementary manner. If the student needs to perceive the event and the process as a whole, a demonstration is used, and if it is necessary to understand the essence of the event and the connections between its elements, an illustration is used .

The effectiveness of the image often depends on the mastery of the presentation technology by the teacher. The didactic value of using instructions in the learning process is determined by the ability to most fully illuminate the essence of the object being studied. At the same time, illustrations are prepared in advance and shown in the necessary places during the lesson in the required size, otherwise their increase in number will confuse students in understanding the essence of the event. In some cases, it is necessary to use the service of handouts (photos, tables, natural objects, etc.) or technical means.

the effectiveness of the use of demonstration methods, it is advisable to comply with the following conditions:

- compatibility of visualization with the age and level of development of students;
- the demonstrated objects were clearly visible to all students;

- highlighting its initial stage and the main process (states) in the demonstration;
- drawing of a model, equipment, weapon, or experiment scheme;
- demonstration and illustration should be in harmony with the content of the educational material.

Literary analysis. As a result of observations and research conducted during the study, it is shown that it is necessary to develop a methodology for teaching professional subjects based on software tools and organize activities to orient students to a profession by increasing their interest in technical disciplines. areas.

The science of building physics has always taken into account social, political and ideological factors and developed in accordance with them. Engineers and builders will have to deal mainly with the technical issues of architecture and clearly imagine the aesthetic possibilities of buildings, reflecting the methods of construction. From this point of view, the experience of the development of architecture not only provides extensive information, but also teaches to theoretically comprehend the problem, helps to solve multifaceted theoretical issues related to the interdependence of structures and artistic forms.

It consists in the study and design of the physical processes occurring in the building and its parts and the influence of these processes on the building and the person, the volumetric-historical and constructive solutions of buildings and the tasks and features of the structural elements and details of the building. In a broader sense, building physics issues teach the theoretical foundations and practical methods of architectural design rules, taking into account natural and artificial light, heat, air movement and sound, their tangible nature and sociological, hygienic and economic aspects. In addition, this science is fundamental in the development of important building documents.

The goals and objectives of the study are as follows:

The purpose of teaching science - the science of building physics studies the physical processes occurring in the building and its parts, and the influence of these processes on the building and the person. In a broader sense, architectural physics studies the theoretical foundations and practical methods of the rules of architectural shaping, taking into account natural and artificial light, color, heat, air movement and sound, their nature of human perception, as well as sociological, hygienic and economic aspects;

To achieve this goal, he fulfills the requirements of the science "Building Physics", theoretical knowledge, practical skills, a methodical approach to the process of designing buildings, the formation of a scientific worldview.

In addition, it is precisely such a science - important building documents are of fundamental importance in the development of building codes and regulations (QMS).

The science of building physics is directly related to the design disciplines "Architectural design", "History and theory of architecture", "Architectural devices".

The physical processes occurring in a building or its parts are mainly of three types:
- heat;

- light;
- acoustics.

Therefore, the science of special issues of architecture consists of the departments of climatology and heat engineering, lighting engineering, acoustics:

Heat engineering studies the movement of thermal energy in a building and its parts and the processes of mass transfer involving water vapor. That is, on the one hand, it is the creation of an internal temperature and air humidity suitable for human habitation and certain types of activities inside the building, and on the other hand, it is the creation of conditions for the long service life of building parts.

Lighting techniques explore the creation of natural light spaces within buildings and the impact of this space on human activities. The main goal is to create indoor natural lighting suitable for specific human building activities and to design economical natural lighting systems (windows).

Acoustics studies the laws of propagation of sound waves inside a building and its devices. Acoustics is studied in two parts. architectural acoustics and building acoustics (architectural and constructive measures to combat noise.)

1. Architectural acoustics studies the laws of creating a sound field that provides a clear hearing for a person inside a room.
2. Building acoustics studies the laws of protection against noise in rooms. Teaching students the basics and their constructive solutions within the framework of the discipline "Construction Physics" on the basis of software training is one of the most pressing issues today. Because the student can demonstrate the construction of the building in front of his eyes.

Main part. Heat engineering studies the movement of thermal energy in a building and its parts and the processes of mass transfer involving water vapor. That is, on the one hand, it is the creation of an internal temperature and air humidity suitable for human habitation and certain types of activities inside the building, and on the other hand, it is the creation of conditions for the long service life of building parts.

Thermal motion can occur in three ways: due to the thermal conductivity of a substance, in the form of light and convection (movement of air or liquid).

Thermal conductivity can be transferred in all solid, liquid and gaseous media. Pure thermal conductivity is observed in solids.

In solids and liquids, energy is transferred by elastic waves, in gases by diffusion of atoms or molecules, and in metals by diffusion of electrons. Most building materials are porous bodies, and all types of heat transfer can be observed in their capillary pores. However, in thermophysical calculations it is assumed that the propagation of heat in the material occurs only due to thermal conductivity.

Thermal energy is converted into light energy at the surface of the object, and this energy is absorbed by the surface of the second object, turning from light energy into thermal energy.

Heat transfer from external enclosing structures occurs mainly due to thermal conductivity.

To derive the differential equation for heat transfer through an external barrier structure, it is assumed that the heat flux passes through an infinitely thin wall in only one direction. An infinitely thin dxlayer separates from this thin wall as the temperature changes. If we assume that the temperature of the layer does not change in time, then the amount of constant heat that has passed through the surface of 1 m dt^{2} of the layer for 1 hour is found by the following formula:

$$Q_2 = -\lambda \frac{dt}{dx} \quad (1)$$

where $\lambda$is the thermal conductivity of the material,$Vt/(m\ ℃)$

$\frac{dt}{dx}$- temperature gradient, deg/m.

The sign (-) on the right side of the equation indicates the movement of heat from a place of high temperature to a place of low temperature.

the amount of heat passing through the outer barrier structure varies with time . The amount of heat passing through external barrier structures varies with time . The formula is differentiated to find the amount of variable heat passed through the outer barrier structure.

$$\frac{dQ_2}{dx} = -\lambda \frac{d^2t}{dx^2} \quad (2)$$

Over time, $dx$the temperature of the layer increased by dtdegrees , the dQ_2amount of heat is directly proportional to the heat capacity of this layer.

$$dQ_2 = -S * \lambda * dx \frac{dt}{dz} \quad (3)$$

this is on the ground

S - material comparison heat power , kJ/kg deg;

Y is the volumetric mass of the material, kg/m3.

The above formula can be written as:

$$\frac{dQ_2}{dx} = -S * \lambda * \frac{dt}{dz} \quad (4)$$

parts of the above formulas (2) and (4) are equal to each other, then it will take the following form.

$$\frac{dt}{dz} = \frac{\lambda}{S * \lambda} * \frac{d^2t}{dx^2} \quad (5)$$

heat transfer equation in one direction.

It is known that in practice the heat flow moves in all directions, so the differential heat transfer equation is written as follows:

$$\frac{dt}{dz} = a\left[\frac{d^2t}{dx^2} + \frac{d^2t}{dy^2} + \frac{d^2t}{dz^2}\right] \quad (6)$$

where $a = \frac{\lambda}{S*\lambda}$, coefficient of thermal conductivity of the material, m ^{2} / hour .

Since the solution of the differential equation (6) above is complex, it can currently be solved with electronic calculators.

Conclusion. Building physics and the construction of buildings and structures is a phenomenological method that involves the involvement of students in specially organized activities that allow them to show an active and effective position in the process of acquiring knowledge and acquiring competencies (training - industrial design, preparation and organization of exhibitions, creating layouts, case method, trips to enterprises, meetings with specialists, etc.), propaganda methods (providing a high level of emotional and psychological impact on students through bright, mind-blowing illustrations and memorable sentences , etc.) were clarified.

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