
Modern Means and Electronic Resources for Visualization of the Educational Process

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Annotation: Currently, the main tasks in the field of visualization of the educational process are the effective use of modern funds and electronic resources. To achieve the completeness and quality of visualization of the educational process, it is necessary to develop an effective system of use of modern means and electronic resources. The article discusses the main directions and didactic principles of use, modern funds and electronic resources to visualize the educational process.

Keywords: visualization, electronic resources, multimedia technologies, animation, visualization learning process, visualization software.

The problems and prospects for the development of existing approaches to the development and use of electronic educational resources for an interactive whiteboard are considered. The experience of preparing future teachers of informatics for the researched activity is presented.

The creation of a modern information space that provides new opportunities, makes life and learning more interesting and exciting, requires the use of such innovations in the educational process as computer learning technologies, interactive multimedia, web-based learning, on-line learning, case technology and etc. These funds make it possible to raise the level of qualification of students, contribute to the mobilization of their independence and improve their professional training.

One of the areas that significantly increase the interest of students and the growth of the quality of education at this stage can be considered the visualization of the educational process using electronic educational resources.

Educational material visualization technologies are based on the importance of visual perception for a person, the leading role of figurative perception in the processes of cognition and awareness of the increasingly necessary preparation of a person and his consciousness for the conditions of the visualized world and the increase in information load.

Visualization in the educational process allows you to solve a number of pedagogical problems: ensuring the intensification of learning, the activation of educational and cognitive activities, the formation and development of critical and visual thinking, visual perception, figurative representation of knowledge and learning activities, knowledge transfer and image recognition, increasing visual literacy and visual culture. A methodically competent approach to visualization ensures and supports the transition of students to a higher level of cognitive activity, stimulates a creative approach.

Modern technologies make it possible to solve the problems of transferring educational

information (telecommunications, distance education, etc.), the formation of skills and abilities (computer virtual workshops and simulators, etc.), automated knowledge control.

The relevance of the visualization of the educational process with the help of electronic educational resources is indicated by the studies of L.L. Bosovoi, L.X. Zainutdinova, A.A. Kuznetsova, I.V. Robert, A. Abdukadirova, M. Lutfullaeva, F. Zakirova and others, which show that the visualization of the educational process with the help of modern software tools contribute to the improvement of the forms, methods and content of education. In addition, these works conclude that in the conditions of visualization of the educational process with the help of modern software, individualization of learning is carried out, the ability to carry out information activities and information interaction is formed.

Visualization of the educational process with the help of modern software enriches the learning process. And also makes it more attractive to the student, allowing to make learning more effective, due to the visual and auditory channels of perception of the student's information.

To visualize the educational process using electronic resources, the following technologies are used:

- Animation - dynamic graphics based on the use of various dynamic visual effects - moving pictures, highlighting with color, font of individual elements of diagrams / tables, etc. Animation is used to simulate experiments, to demonstrate the principles of operation of various mechanisms, to illustrate movement financial flows in the enterprise, in the study of various dynamic processes.
- audio application - an audio recording, most often they are small monologue comments of the teacher to some diagrams, tables, illustrations, etc. At the same time, schemes and tables can be provided with an animation effect.
- slide show with synchronous sound;
- Video lecture - a video recording of a lecture given by a teacher. It is methodologically expedient to record a small lecture, the subject of which allows students to get acquainted with the course and its author with the most complex problems of the course. The video lecture activates the "personal" factor in learning, introducing the image of the teacher into the arsenal of teaching aids. The easiest way to film a video is with a video camera and then digitize it and enter it into electronic information resources.

Modern electronic educational resources contribute to the enlarged structuring of the content component of the educational process, independent choice and passage of full or reduced training options.

To visualize the educational process, there are a large number of software tools for the development of electronic educational resources. They can be divided into several categories:

- tools for creating and processing images;
- tools for creating and processing animation, 2D, 3D graphics;
- means of creating and processing video images;
- means of creating and processing sound;
- Presentation tools.

Let's consider a number of the most well-known software tools used to visualize the educational process using electronic resources.

Graphic editors - designed for creating and processing images and have a set of tools that allow you to adjust various images:

Adobe Photoshop is a professional photo editing package. Supports working with layers and exporting objects from vector graphics programs. It has a full set of tools for color correction, retouching, adjusting the contrast and saturation of colors, masking, creating various color effects. More than 40 filters allow you to create a variety of electronic resources.

Corel Photo Paint is a graphics editor that has everything you need to create and edit images, but is inferior to Adobe Photoshop in terms of speed when working with files. Allows you to publish these images on the web. Contains tools for working with animated images and slideshows in QuickTime format.

PhotoDraw is an editor that combines the capabilities of century-old and raster graphics packages. It contains a large set of drawn figures and many types of lines for their design, including a variety of artistic brush strokes or photo images. When using templates, a special wizard guides the user through all steps to create an illustration of the required type. PhotoDraw supports saving illustrations in the format of most other applications. It includes a large number of different effects that can be applied to images and individual objects, in particular, you can choose the effects of adding a shadow, setting transparency, blurring or strengthening the boundaries of objects, giving them three-dimensionality, perspective distortions, as well as special effects that give the image the appearance of a pen pattern, sketch, painting and many others.

Tools for creating and processing 2D - graphics and animations work with a vector way of representing graphic objects and images that are saved as a geometric description and exist independently of each other, which allows you to change the layer, location and any other attributes of the object at any time, creating random composition. Modern vector graphics programs also contain tools for working with raster images.

2D animation uses the traditional frame-by-frame animation method:

- CorelDRAW is a powerful graphics editor with a huge library of ready-made images, which has already become a classic vector drawing program. The package is intended not only for drawing, but also for preparing graphics and editing bitmap images. It has excellent file management tools and the ability to show slide films on a computer display, allows you to draw by hand and work with image layers, supports special effects, including three-dimensional ones, and has flexible options for working with texts.
- CorelXARA - a package that allows you to create vector images. It has a beautifully implemented transparency effect with gradient properties. The program performs basic operations with raster images: changing the color depth, brightness, contrast, sharpness, applying a blur filter and other special effects. Huge internal resolution allows you to magnify objects up to 2500 times. Allows you to view JPG, GIF and animated GIF files.
- Adobe Illustrator is a vector editor designed to create illustrations and develop general page design and is focused on outputting high-resolution images. The package allows you to create free-form shapes and symbols, and then scale, rotate and deform them. In addition, Illustrator contains a wide range of tools for working with text and multipage documents.

Three-dimensional technology animation resembles the creation of a doll cartoon: you need to create framework frameworks, define materials that are tightlying, to conport all in a single scene, set lighting and chamber, and then set the number of frames in the film and the movement of items. The movement of objects in three-dimensional space is set by

trajectories, keyframes and with the help of formulas connecting the movement of parts of complex structures. After setting the desired movement, lighting and materials, the visualization process is launched. For some time, the computer calculates all the necessary frames and gives the finished film. The disadvantage is the excessive smoothness of forms and surfaces and some mechanistic of the movement of objects. To create realistic three-dimensional images, various techniques are used. To create "uneven" objects, the technology of forming an object from a plurality of particles is used. Inverse kinematics and other conventional techniques are introduced, new methods for combining video recording and animated effects, which allows you to make scenes and movements more realistic.

To visualize the educational process using electronic resources, a number of popular programs are used to work with 3D graphics:

- 3D Studio Max is one of the most famous packages of 3D-animation manufactured by Autodesk. The program provides the entire process of creating a three-dimensional film: modeling objects and formation of scene, animation and visualization, video operation. The program interface is one for all modules and has a high degree of interactivity. 3D Studio Max implements advanced animation management capabilities, stores the history of the life of each object, allows you to create a variety of lighting effects and has an open architecture, that is, allows third firms to include additional applications in the system.
- TrueSpace - Caligari package is intended for three-dimensional animation and is easy to use, flexibility in managing forms, support for splines and boolean operations over objects. An innovative interface shows the tool line directly in the 3D-space and aligns them on the object. Extensions and openness of architecture allow you to increase the package options.
- Ray Dream Studio - the program provides a set of professional tools for 3D design and animation. Users can create various models using Boolean operations and deformations. You can apply various textures or video images to these models, and also draw directly on their surface. To edit the video there are a large number of software products. In addition to three-dimensional animation packages, highly specialized programs exist, for example, to create bulk fonts. They also use a variety of animation effects, perform image visualization and allow you to create video files. Some of them are listed below.
- Programs for working with sound can be divided into two large groups: sequencers and programs oriented sound recording technologies, so-called audio editors.
- Used programs of sound editors to visualize the educational process using electronic resources allow you to record sound in real time on the hard disk of the computer and convert it using digital processing and combining the various channels:
- Cakewalk Pro Audio - professional multi-track sequencer of Twelve Tone Systems enjoys well-deserved popularity among professionals. Cakewalk was one of the first program products, which appeared support for additional connected modules for a variety of audio effects created for the DirectX interface. The characteristic feature of DirectX-effects is that they all work in real time and you can configure all the parameters of the selected effect directly in the process of playing the sound fragment.
- Logic Audio Platinum - Professional Emagic sequencer. Provides recording DirectX, real-time processing, can work with multiple audio cards. It also allows you to write a sound and perform digital processing it.

- Sound Forge is a program that is one of the leaders among sound editors. It has powerful editing features, allows you to embed any connected modules that support DirectX technology has a convenient modern interface, supports modern sound formats, including RealAudio.

Programs for creating a presentation, originally designed to create electronic slides that help illustrate the speaker's message, recently they are increasingly focusing on use to visualize electronic resources. There are a large number of such programs that differ in a set of visual and animation effects, of which the Power Point program.

Power Point is a presentation program included in the Microsoft Office package. By the number of visual and animation effects, it is not inferior to many copyright tools of multimedia. Contains means to create a flexible script for the presentation and recording sound accompaniment of each slide. The presence of a Russian -speaking version allows you to successfully work with texts in Russian. Built -in Internet support allows you to save presentations in HTML format, however, animated components require the installation of a special addition to Power Point Animation Player. Allows you to create complex software superstructures in the Visual Basic for Application programming language, which significantly expands the features of the program.

The process visualization of the educational process using electronic resources is very complex. It is attended by specialists of a personal profile: computer artists; audio / video engineers; Programmers.

Visualization of the educational process using electronic resources allows:

- to solve the objectives of humanization of education;
- increase the effectiveness of the educational process;
- develop the personal qualities of the learners (intellect, the ability to self-education and self-education, creative abilities, the ability to change the knowledge gained in practice, cognitive interest, attitude towards work);
- develop the communicative and social abilities of the trainees;
- to significantly expand the possibilities of individualization and differentiation of open and distance learning through the provision of each trained personal teacher whose role is performed by a computer;
- to determine the student as an active subject of knowledge, to recognize its intrinsicity;
- take into account the subjective experience of the trainee, its individual features;
- carry out independent learning activities;
- Develop an informational culture of personality.

Conclusion can be noted that, experience visualizing the educational process using electronic resources shows:

- The interest of students in work and their activity sharply increases;
- The algorithmic style of thinking is developing, the ability to make optimal decisions is formed, act variable;
- The teacher is freed from the mass of routine work, the possibility of creative activity is given on the basis of the results.

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