



Creating Multimedia Applications and Using Them in the Teaching of “Digital and Information Technology” in Higher Education

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Abstract

This article describes the rules of using multimedia applications in the teaching of “Digital and Information Technology” in higher education. There are also suggestions for programs used in the creation of multimedia materials.

Keywords: *Higher Education; Educational Process; Digital and Information Technology; Multimedia; Multimedia Technologies; Multimedia Hardware; Multimedia Software Tools; Hypermedia Technologies*

Introduction

The effectiveness and perfection of the learning process are highly dependent on the way information is given by educators and acquired by the students and the way this information is applied in practice. Pedagogical processes in which multimedia technologies are taught provide future professionals with information in the form of animation, audio, and video.

Nowadays the main components of computer and information technology tools that are required to increase the effectiveness of the training process of future professionals include curricula, multimedia technologies, distance learning teaching aids, virtual laboratories, electronic textbooks (ET), online libraries, internet services, etc. and they are considered to be vital.

For the perfect use of computers and information technologies in the educational process, the main focus should be maintained on the provision of the necessary conditions for the teacher and the student and the effective use of computers. At the same time creating multimedia e-learning and methodological manuals is found to be necessary to ensure that the learning process is based on modern information and computer technologies and it is recommended that these manuals should be implemented with the participation of qualified specialists, science teachers and pedagogical psychologists.

The main areas of application of multimedia technologies in education are the following: video encyclopedias, interactive guides, simulators, intellectual games, computer training and distance learning systems.

The Main Part

The use of multimedia products in the pedagogical process can be categorized in two different ways.

- Use of pre-designed software products that are relevant to the subject area being taught. It is proved that the issue of selection is more complicated because the existing products must be suitable for the subject program, must meet the requirements of reliability, level of acceptance, as well as the completeness of the information provided by the educator. However, a problem related to this area is caused because of the lack of specialist-educators with the necessary knowledge in the field in the process of creating manuals.
- Creating a multimedia product appropriate to the purpose of the subject taught by the teacher and the scope of the covered issues. To do this, science teachers need to improve their skills in the field of multimedia technologies in various courses and have to learn the capabilities of the computer, interactive whiteboard and the additional means of displaying images in more detail.

Both of these approaches require a high level of professional knowledge in the field of multimedia technologies, as well as good training in the effective use of hardware and software.

Multimedia systems and technologies. The term multimedia does not have a single clear definition since it is interpreted differently by various experts in different fields depending on the content of its application.

Experts in the field of electronics interpret the term multimedia as different hardware which allows working with different forms of text, graphics, animation, sound, video, and other forms of data. It consists of various disk devices, sound cards, video cards, external collectors and so on.

Designers, animators, programmers interpret it as ready materials such as text, sound, animations that allow the user to interact in several ways through this concept.

The most common form of the concept of multimedia (multimedia tools) is that it is the set of software and hardware tools that are designed for the development, creation of texts, images, tables, diagrams, photographs, video and audio fragments, and other various information in digital form.

Nowadays multimedia technologies can be seen in various fields of human activities such as business, education, medicine and others.

Multimedia tools are the set of hardware and software tools that allow a user to communicate with a computer using a wide variety of environments that are natural to humans such as sound, video, graphics, text, and animations. The most important feature of multimedia technology is that it provides users with the ability to operate the process of working with information.

Posters, manuals, laboratory experiments are usually used as means of visual demonstration in computer-related presentations, lectures, or other speeches. Slide projectors, overhead projectors, slides that display graphic images on the screen are also used for this purpose. The use of a computer and a multimedia projector allows users to prepare and present a presentation with visual materials which includes all the necessary aspects of the quality organization of the speaker's speech accompanied by audio, video, and animation.

Many multimedia software products have been created in recent years such as encyclopedias, tutorials, computer presentations, and others.

Multimedia products are:

- *The first* is a software product that provides the user with interactivity, that is, a dialogue environment that allows the exchange of commands and responses between a person and a computer;
- *Second* is the environment in which various video and audio effects are used.

Today the development of the multimedia industry has made creating a fake model of the real world possible. It includes concepts that are defined as virtual reality or virtual being. Multimedia provides the user with a great opportunity to create a fantastic world (virtual), in which the user does not play the role of a passive observer on the periphery, but actively participates in the events that take place there; however, communication takes place in a language that is common to the user, primarily in the language of audio and video.

Virtual reality is associated with the concepts of immersiveness and interactivity. Immersiveness means that a person assumes himself in virtual reality. Interactivity allows the user to interact with objects in virtual reality in real-time and interact with them.

A virtual reality system is defined as a set of software and hardware that creates an imitation environment. To ensure interactivity, the operator of the virtual system must take several steps. These actions must be multimodal that are visual to the eyes, receptive to the sound. Various audio and video technologies are used in modern systems to perform these operations in practice.

3D technology is a Multimedia tool that is a set of hardware and software that allows a user to communicate with a computer using a wide variety of environments that are natural to humans such as sound, video, graphics, text, animations. The advent of 3D technology in the field of multimedia has started a new era in this field. It should be noted that 3D technology is the most advanced method of visual and audio transmission of images in the world.

Multimedia tools:

- *Hardware:* projector, interactive whiteboard, graphics accelerators, etc.;
- *Software:*
- *Multimedia applications:* encyclopedias, interactive teaching courses, games, electronic textbooks, etc.;
- *The creation of multimedia applications:* video editor, graphics editor, sound editor, animation programs, files, hypertext, and others to work with the program.

Designing multimedia applications. The content of the multimedia application is analyzed in detail by the author during the preparation of the script and is determined during the development of the technological scenario.

Illustrations, tables, and diagrams with animated elements and beautifully decorated multimedia applications accompanied with sound facilitate the easy acquisition of the studied material, help to understand the process better and remember it, increase the learner's activity in the learning process, provide a clearer and more complete understanding of the subject.

There are varieties of different technological approaches aimed at developing quality multimedia applications. Several basic technological recommendations should be followed when creating and using these applications.

The bases for the creation of multimedia applications include a method of systematization based on the division of material into elements and its presentation in a hierarchical manner.

The material coverage model at the initial stage of multimedia application design allows:

- Clear definition of the content of the material;
- Present the content in a visual, clear, and transparent manner;
- Determination of the content of multimedia application components.

Taking into account several general psychological advances in the development of methods for visualizing information on a computer screen helps to formulate recommendations:

- The information on the screen must be logged;
- Visual information should be periodically exchanged for audio information;
- Color brightness and volume should change periodically;
- The content of the visualized material should not be too simple or too complex.

When developing and creating a frame format on the screen, it is recommended to take into account the purpose and relationship between the objects that determine the organization of the viewing area. It is recommended to place items as follows:

- close to each other, which means the closer the objects are to each other in the field of view, the more likely it is that they form a single, coherent image;
- the similarity of the processes, i.e. the greater the similarity and integrity of the images, the greater the probability that they will match;
- taking into account the characteristics of continuity, that is, the more elements in the field of view that correspond to the continuation of an orderly sequence, the more likely they merge into a single image;
- taking into account the specificity of the definition of the subject and the background in the choice of the shape of objects, size of letters and numbers, color saturation, text placement, etc.;
- without decorating the visual information with extra details, bright and contrasting colors;
- changing the color of the material to be memorized by underlining or changing the font size and style.

When developing multimedia applications, it is important to take into account that objects depicted in different colors and backgrounds are perceived differently by people.

The contrast of objects to the background plays an important role in the organization of visual information. There are two types of contrast: direct and inverse. In direct contrast, the object and its images are darker than the background, and in contrast, they are lighter. Both types are typically used in designing multimedia applications, either separately in different frames or together within a single frame. In most cases, inverse contrast predominates.

It is preferable to work in direct contrast when designing multimedia applications. In this case, an increase in brightness leads to an improvement in appearance and vice versa, but the letters and symbols displayed in inverse contrast are read more accurately and faster than the direct contrast, even at a small size. The larger the relative size of the image parts and the higher its brightness, the smaller the contrast should be. With the equal distribution of light on the screen, the information on the screen can be accessed easily.

To optimize the learning of information from a computer screen, multimedia application developers are advised to use logical accents. Methods that focus the learner's attention on a particular object are called logical accents. The psychological impact of logical accents is related to the reduction in the time spent by the learner to find the main object and the focus on that object.

In most cases, the following methods are often used to create logical accents: depict the main object in a brighter color, change the size, brightness, position, or separate it with radiant color. Logical emphasis can be quantified by its intensity. The intensity depends on the proportion of the color and brightness of the object relative to the background and the relative size of the object relative to the size of the objects in the background of the image. It is better to mark with brighter or more contrasting colors, however, changing the size or brightness, separating with a radiant color does not work well.

When studying the technology of creating multimedia applications, a scenario is needed to be developed that describes how they are created. Also, we can logically conclude that each multimedia application consists of different components (different themes). The content of multimedia applications can be divided into the following parts: selecting a theme for the created multimedia application, defining the workspace (scale and background), using frames, layers, creating symbols of different shapes, entering variables in the programming language and writing scripts, working with audio files, add text, create effects, use and import images, use ready-made components in the library, create navigation, use text marking languages and scripting languages. There are many technical tools for creating a multimedia product.

Multimedia software. The following steps can be used to create a multimedia product:

- Use a programming language that requires working with an entire team of qualified programmers;
- Use of instrumental tools.

Examples of instrumental tools are sound programs: All Sound Recorder, AudioMASTER, Sound Forge. Video editing software: Adobe Premiere, Corel VideoStudio, Pinnacle Studio, Camtasia studio. Computer screen recording software: Snagit, Icecream Screen Recorder, Adode Captivate, Camtasia Studio. ISpring, AutoPlay, and CoursLab for creating and editing educational audio and video materials. Image processing: Adobe Photoshop, Corel Draw. Adobe Animate, Anime Studio, 3D Max, and other special software products are used to create 2D and 3D animations.

Conclusion

With the help of the above-mentioned requirements and software, a multimedia electronic complex on the subject of Information Technology was created for students majoring in foreign philology. With the help of this, students can learn topics independently using video and animated data; also, they can do self-control using thematic tests in the control section. This electronic complex is used by the university through the e-learning system online and via external disks on a personal computer.

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