CREATING A MECHANISM OF E-LEARNING EDUCATION RESOURCES ON THE BASIS OF MODERN 3D TECHNOLOGIES FOR GENERAL SECONDARY SCHOOLS

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ABSTRACT

The following article deals with the stages of creating electronic information and educational resources for secondary schools, the technical requirements and the effective use of 3D animation technologies in the creation and widespread use in the educational process.

Keywords. Information and communication technologies, electronic information and educational resources (EATR), video lessons, 3D technologies, technical requirements, DTS (State educational Standards) and curriculum.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

Nowadays, video lessons have been taken and broadcasting on national TV channels in order to provide students with the opportunity to study remotely with the help of video lessons, in cooperation with the Ministry of Public Education and TV channels of the National Television and Radio Company. These video lessons are being posted parallelly on the social networks and websites of the Ministry of Public Education.

Of course, an increase in the efficiency and quality of education can be expected from being informed only, if new educational products have some innovative quality indicators. The main innovative quality indicators of educational resources include:
- Coverage of all components of the educational process. Including: obtaining information, practical training, and certification (mastering control);
- It should be noted that the books are intended for information only;
- Ensuring a sharp increase in opportunities for independent work through the use of interactive, active forms of learning,
- Creation of more complete reading opportunities outside the classroom (auditorium).

In this regard, with the participation of the co-author of the article S.M. Muminov was issued the State Standard of the Republic of Uzbekistan "Basic requirements of electronic methodological complexes and other educational resources to be included in the national system of e-learning." This standard was approved by the Ministry of Higher and Secondary Special Education in coordination with the Ministry of Health, the Ministry of Public Education and the Ministry of Information Technologies and Communications and registered by the Uzbek Agency for Standardization, Metrology and Certification on November 17, 2017 UzDSt 36.2030: 2017.

In order to support the creation of e-learning content, this standard regulates the e-learning system, e-learning resources, aimed at developing general technical requirements and improving the information-learning environment of students. Also this standard is aimed at improving the content of new e-learning resources, improving the quality and efficiency of the educational process through the use of modern information and communication technologies, creating an e-learning environment, the gradual introduction of e-learning in practice, distance learning methods widely used in international practice that is aimed at increasing the efficiency and creating a single electronic information and educational environment in the education system that meets international standards.

Also, each created e-information and educational resource must meet the following minimum requirements:

№	Materials	Identity of measurement	Amount
1.	Text (a number of signs)	Thousand	100% of the theme
2.	Photo illustration (the amount of images and pictures0	Piece	50%photos of the theme
3.	Animation (amount of different views)	Piece	According to the demand
4.	3D animation materials	Piece	According to the demand
5.	Videos (duration of videos for the whole course)	Thousand	According to the demand 3-5 minutes
6.	Audio materials (duration of audio clips for the whole course)	Thousand	According to the demand 3-5 minutes
7.	Laboratory work (number of laboratory works)	Piece	According to the demand
8.	Tests (number of test assignments)	Piece	For each theme
9.	Interactive exercises (quick questions and answers)		
10.	Questions, tasks, activities and exercises	Piece	According to the demand
11.	Game views	Piece	According to the demand
12.	Glossary	Piece	According to the demand
13.	DVD disc	Piece	1

EATR must be processed by the publishing review and represent the appearance of the educational electronic edition in accordance with GOST 7.83-2001, placed on a CD.

The EATR resource must be accompanied by a user manual in the form of a brochure placed on a CD and attached to the disc.
EATR should be available on standalone and networked personal computers.

Stages of creating EATR
Developing a plan for the creation of EATRs, approved by the members of the working group;
Targeted analysis of the DTS, curriculum, existing textbooks and manuals on the subject specified in the development of the EATR by the approved working group;

Based on the analysis, the main elements of knowledge, skills and competencies provided in the STS and curriculum (as well as other useful didactic and methodological materials from other sources) is selected (use in the formation of terms of reference, scenarios, materials for)

In developing the requirements for the technical parameters of the created EATR, the following conditions must be provided and expressed:

• Ability of the EATR to operate normally in accordance with the required environment, network mode and other publications and resources;

• Correct use of modern multimedia tools and telecommunication technologies;

• Reliability, stability, heterogeneity, resistance to defects;

• Availability and quality of protection against unauthorized actions;

• Simplicity, reliability and completeness of the installation and non installation process;

• Required memory capacity;

• Adequacy of satellite technical kit for EATR (availability of necessary system programs, fonts, etc.);

• Compatibility of the installer with other software tools;

• Working condition of all the specified functions and capabilities of the EATR;

• Flexibility of EATR to work with other means at the same time;

• Prompt response to user requests.

• Compliance of EATR with sanitary norms on age characteristics of students and use of computer equipment;

• Conformity of aesthetic decorations to the functional functions of the EATR;

• The order and meaning of the graphic and pictorial elements in the learning environment, the compatibility of colors with the tasks and purpose of the EATR (instead of the recommendation).

In accordance with the state educational standards, electronic information and educational resources "Biology-10" and "Physics-10" are being created for the 10th grade of secondary schools. This electronic information-educational resource was developed by the practical research project of the Uzbek Research Institute of Pedagogical Sciences named after T.N. Kari Niyazi "Creation and introduction of a new generation of electronic teaching aids for natural (Physics and Biology) in secondary schools." developed (Figure 1).

Home Pages (Figure 1)

By analyzing the research on the formation and implementation of e-learning resources for secondary schools, the system of use of e-learning resources in education is scientifically based, the ways of forming and presenting educational information in e-information resources for secondary schools are identified and resources are created. Notpad ++, Adobe Audition, Adobe Photoshop, Adobe Aftereffects, Adobe Primer, Adobe Flash, Google Sketchup, Lumion,

3DsMax, Adobe Animate, Action Scrip, Adobe Dimension and other modern software systems were widely used in the development. This e-learning resource consists of lectures, videos, 3D animation, interactive animation, tests, interesting questions and answers, glossaries, photos and other sections.

To turn up the volume on the home page or content section, or to turn it off altogether, you can edit it from the menu below, open the topic, and read the information in it. You can read it by visiting the lecture section. At the bottom of the screen is a menu bar where you can use lectures, questions and answers, tests, interactive exercises, videos and other resources.

You can view the contents of the infographic menus by selecting the conditionally illustrated infographic menus below. Without going to the main page, click this button to go to the next topic page, view questions on the topic in the questions and tasks section, watch videos on the topic in the videos section and pause.

To use animation and videos related to Biology, click the Play button. You can also see tables on the topics covered in the textbook.

3D animations made in Adobe Flash and 3DsMax programs for modern animation are included. Adobe Flash is a technology based on the use of vector graphics in the format ShockWaveFlash (swf) and is a program that works in the environment and creates animations, videos, web pages, interactive, soundtracks, as well as programmed, controlled animations in the programming language Actionscript.

3DS Max is widely used in three-dimensional graphics, two-dimensional 3D modeling with 2D graphics programs, creation of educational resources, engineering design work, construction of computer models of physical objects, advertising, architectural design, fine arts, television and design work. In recent years, traditional, animated and demonstration programs have become widespread.

In addition, 3D animations in space are created in the 3DsMax model, motion effects are made in Adobe Aftereffecta, videos can be cropped and edited through Adobe Premiere, and then rendered into a video for conversion to the desired format.

Adobe Premiere Pro offers many different effects for video editing and is used to optimize video data. Using it, we create 3D animation and color it accordingly. The 3DsMax model is also rendered in Vray, and the animations are made in Adobe After Effects.

Effects is a universal computer program that allows you to edit, compose, and create visual effects and animations for any video. It is often used in the post-production phase of video lessons, film and television. It also works as a very simple non-linear editor, audio editor and transcoder for multimedia. The video editor can be used more after effects, the title and the animator can use it is widely used in the work of creating 3D cartoon characters. Therefore, this resource has been widely used in 3D animation on the subject of DNA.

Minimum requirements for computer technology for use in the educational process of EATR:

Computer type:	Pentium-IV and above
Language of programming:	ActionScript 3.0
Operational system:	Windows 2000\XP\Vista\7\8\10
Size of the program	1 597 120 kb

Electronic information-educational resources "Biology-10" and "Physics-10" created for the 10th grades of secondary schools in accordance with the state standards in the latest animation and modern software technologies are available on the information-educational portal of the Ministry of Public Education of the Republic of Uzbekistan www.eduportal.uz and other educational sites There are the following options for using it through the portal:

- Use them in unlimited quantities at the same time;
- Electronic reproduction in the required copies;
- Distance learning, home schooling;
- Quickly find additional materials, lecture practice, video, audio, animation and other information;
- Use in combination with alternative (backup) options;
- Link to the database and the source of the necessary literature;
- Demonstrate concepts based on the information provided;
- Effective implementation of on-line communication, etc.

Another requirement for EATR is that the training material and its software must be placed on a single SD or DVD disc that will automatically start working. For this purpose, it is planned to prepare a DVD and distribute it to secondary schools. To use it on a computer, we need a computer's DVD drive (DVD drone). In order for the disk to work without problems for a long time, it is advisable to treat them carefully, use them correctly and copy them if necessary, and when using a computer, open the new folder on the disk and write it to the computer memory.

In conclusion, the field of activity related to the introduction of modern information and communication technologies, e-learning resources, video and audio lessons, tests, virtual laboratory work and small educational resources are the introduction and development of teacher absence learning technology. In the rapidly evolving age of information technology, the goal is to increase the use of information and communication technologies in education through the creation of e-information and educational resources, to help students learn independently, to create opportunities for additional education in addition to existing textbooks and curricula.

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