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Electronic textbooks as an element of education digitization

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***Abstract* — It has been established that the use of information and communication technologies is an important element of the educational process. Lecturers and creators of electronic publications are gaining more and more opportunities to create digital textbooks that are interactive and adapted to the educational process.**

It is shown that the involvement of students in the creation of electronic publications develops the cognitive independence of students that is one of the key pedagogical tasks for the modern education system.

Keywords — information environment, professional activity, electronic publication.

I. INTRODUCTION

Currently, we are witnessing global changes taking place in education throughout the world and in Russia in particular. The most noticeable changes, in our opinion and the opinion of many researchers, concern the informatization of education [11], [15], [19].

Objects, created with the use of information and communication technologies (ICT) are used in education from different sides: in education management; in the implementation of information openness of education and, of course, in the implementation of the educational process and in extracurricular activities [1], [11], [12].

The use of information and communication technologies in online learning can significantly improve the quality of administrative, communication and educational resources, provide training in a limited infrastructure, and ensure accessibility of education through the controlled use of space and time [21].

It should be stated that the books created using ICT started to be used after in 1971, the American writer Michael Hart invented and created an e-book based on the historical document “US Declaration of Independence” [5], [14]. And the idea of creating electronic books, in fact, arised in 1945 from at American scientist, engineer Venivar Bush, who spoke first about devices that allow storing records, processing them, and transmitting [15].

Thus, in relation to electronic educational editions it is possible to apply the well-known proverb: "everything new is well forgotten old". The most rapid development of this sphere has been noted in recent years - publications created using ICT have appeared in almost all subjects and at all levels of education [9], [10].

It should be noted that in the context of the tasks set for the innovative development of the information environment of educational institutions, the implementation of new federal state educational standards, and the modernization of the Russian economy, the development of science education plays an important role. High-quality implementation of natural science education involves filling it with teaching materials, educational publications using ICT and electronic educational resources (EER).

In the implementation of curricula in the direction of training 44.03.05 Pedagogical education (sections: biology and chemistry; biology and geography), organized on modular principle, we can note the prospects for creating a complex by modules, including the subject areas “Biology”, “Chemistry” and “Geography”.

This complex may include a single system of electronic publications: lecture courses; workshops; workbooks; digital educational resources; open information and educational environment of the university.

This complex will make it possible to enrich and modernize natural science education, prepare graduates for subsequent professional development not only in science, but also in information technology.

In connection with the above, the creation of e-learning publications on the subjects of the natural science cycle is very important.

II. RESEARCH METHODOLOGY

A theoretical analysis of the scientific literature in the framework of the problem under study; the programs used to create electronic publications (EP) were studied; the Federal Law "On Education in the Russian Federation" and the federal state educational standards of higher education (GEF IN) were studied in the direction of the preparation of pedagogical education.

III. THE RESULTS OF THE EXAMINATIONS

Now the lectures regard using ICT during education process from different sides: firstly - some of them think that a computer should be used only for the purpose of getting the necessary information quickly (for example, when writing reports, abstracts, etc.) that, in fact, oppose the use of electronic textbooks and teaching aids in the continuous educational process; secondly, others call for the use of electronic publications that are analogous to print publications, admitting the presence of hyperlinks in them; thirdly, some people claim that an electronic textbook should contain not only textual information, hyperlinks, tests for knowledge control, but also the audiovisual part.

In fact, all positions have the right to exist, however, in our opinion, the best combination is the harmonious combination of these positions.

You should pay attention to the fact that with the adoption of the Federal Law "About Education in the Russian

Federation", electronic books became "legal" from a legal point of view.

Thus, according to the Article 18 of the Law, "The Library Fund must be staffed with printed and (or) electronic educational publications (including books and teaching aids), methodological and periodicals in all subjects, courses, disciplines (modules) that are implemented in basic educational programs. " [13].

This paragraph of the article concerns educational organizations of any level and form of ownership. It should also be stated that electronic educational publications imply not only electronic textbooks, but also electronic textbooks and does not exclude the possibility of a total transition to electronic publications in educational institutions.

Students are more likely to encounter digital publications in one form or another at all levels of their educational trajectory. However, despite the fact that many of them have significant experience with mobile devices and the digital environment, at least in their personal lives, they are often not ready to study in the digital environment [25].

GEF VO 44.03.01. Pedagogical education (as amended on 12/04/2015 and of 02.22.2018) and 44.03.05 Pedagogical education (with the editorship of two profiles), as amended on 09.02.2016 and of 22.02. 2018 implies the presence in the university of electronic information and educational environment.

Electronic educational editions have their own characteristics: dynamism; structured material; the ability to add new material at any time; the ability to adapt it for students with disabilities; the possibility of checking the knowledge gained, etc. [7].

Textbooks on paper are quickly becoming obsolete, many of the textbooks are poorly illustrated and they often have black and white illustrations, which undoubtedly worsens the perception of information, especially in the sciences of the natural science cycle, in particular, on the courses "Cytology", "Histology with the basics of embryology" .

The modern market offers a large selection of programs for creating electronic educational content. At the same time, along with paid ones, there are also the ones distributed for free [4].

Every program has its own advantages and disadvantages, and because of that when choosing a program it is important to take into account the level of "computer literacy" of the creator of EP, the volume of the future edition, the goals of the publication, whether sound, graphic and video files will be used in EP and muany more factors.

Let's consider some of the most common programs.

eBooksWriter LITE (developer Visual Vision) is a free program with the help of which you can create textbooks for personal computers and mobile devices [17].

NeoBook Professional (developer NeoSoft Corp) is a paid professional program for creating e-books, educational materials, presentations [20].

EBook Maestro FREE (developer eBookMaestro.com) is a free program designed to create multi-functional presentations and electronic books [16].

WebExe (developer Wulfsoft) is a paid program that has a demo version that allows you to convert HTML pages into one EXE file. You can create textbooks, electronic journals [24] with its help.

Course Designer iSpring Suite is suitable for creating professional electronic courses [8].

TurboSite (developer Brullworfel) is a free program for creating an HTML site or an electronic textbook with a feedback form, comments, feature for inserting video files and other features [23].

After analyzing the programs that can be used to create EP, we used the most convenient, in our opinion, program - TurboSite. One of the advantages of this program is that it's free. But it has many more: simplicity of the use, presence of many ready-made templates, ability to view and edit the result at any stage of creating EP, and the product created with the TurboSite program can be opened on personal computer without an Internet connection. These advantages allow to neglect some disadvantages, for example, that in the structure of the electronic textbook all sections will be of the same level.

We created two EP with the help of the TurboSite program: electronic educational publication "Cytology" (Certificate no. 20630 of December 9, 2014 SAS RAS "Institute of Scientific and Pedagogical Information Joint Foundation for Electronic Resources Science and Education") [2]; e-textbook "Histology with the basics of embryology" (state registration number 0321704417, FSUE STC "Informregistr") [3].

The EP data is intended to facilitate students' individual work on the courses.

The electronic publication "Cytology" is a summary of the course "Cytology", read by the authors-compilers, created in the light of current data. The textbook introduces updates, additions of new modern information. Also, the electronic educational publication contains materials that allow to consider cellular components not in isolation from each other, but in an integral complex. The structure of EP has its own features: convenient navigation with the division of material into sections (chapter, lecture material); every section consists of text hyperlinked to graphic material; every section is linked by hyperlinks to other components so that the user has the choice of moving to any part of the EP; the user independently controls the change of personnel, has the opportunity to use the dictionary of terms at any time. With the help of hyperlinks, the student can move to another text or picture for a more detailed consideration of diagrams, drawings or photographs.

In EP, we pursued the interests of readers and we sought to maximally facilitate the work with extensive and complex material. The manual is filled with modern data and vocabulary of terms, which can be entered from every page of the textbook, video files, illustrations, taking into account the experience of teaching the subject. Every section ends with questions for self-control and individual work.

The electronic textbook "Histology with the basics of embryology" contains theoretical, illustrative and test material for a similar course, read to the students enrolled in the undergraduate study program in the training course 44.03.05 Pedagogical education, profiles of biology and chemistry, biology and geography. This publication is local, multimedia, independent, interactive. EP also has easy navigation, the student is provided with the ability to switch from one section to another using hyperlinks, the publication has been supplemented with a set of microphotographs for all sections of the course, the user can always test their knowledge using test items also developed for each topic considered in the course. The availability of a glossary of terms, which can be accessed from any page, also makes the perception of theoretical material easier.

IV. DISCUSSING THE RESULTS.

The electronic educational edition is intended for individual study of the theoretical material of the course and is built on a

hypertext basis, allowing to work on an individual educational trajectory with a convenient pace of work and the way of presenting the material corresponding to the psycho-physiological features of its perception. The electronic educational edition allows the student to obtain the necessary background information in a compact form in the existing glossary quickly and at any time.

The EP complex in the disciplines "Cytology" and "Histology with the basics of embryology" must be supplemented with electronic atlases.

Presently, the work of creating electronic textbook publication "Atlas of histology" is finished. Paragraph: epithelial tissue". The students are involved in creating atlases on histology, for the purpose of motivation to learn.

While being involved in the creation of a source of potential information, the student forms a personal educational structure. The training, meanwhile, is carried out through many channels, as for compiling the training material it needs to collect a large amount of diverse information. The ability to learn something new, master new skills is more important than just the knowledge that we possess [6], [19].

Student learning strategies may vary depending on the digital resources used, and a digital resource may also affect the user's cognition and learning [18], [22].

V. CONCLUSIONS

Thus, theoretical research and practical experience have shown that the use of information and communication technologies in the educational process is an important element that makes teacher's task of presenting the material and students' successful mastery of the material easier.

New electronic tutorials are made by the teacher with the help of students in order to increase their motivation to learn. It is shown that this method develops the cognitive independence of the student, which is one of the key pedagogical goals for the modern education system.

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