

Analysis of software products for the development of electronic textbooks in the information and educational environment of the university

Marina Modina¹, Valentin Skoda^{2,*}, Denis Deikun², and Anzhelika Voskanyan¹

¹ Admiral Ushakov Maritime State University, 93 Lenin Ave., Novorossiysk, 353924, Russian Federation

² Krasnodar Higher Military Aviation School for Pilots n.a. Hero of the Soviet Union A.K. Serov, Russian Federation

Abstract. At the current stage of development of the educational space, one of the ways to enhance the learning activities of students is the use of information technology. The use of electronic information and educational resources in the educational process (e.g., electronic textbooks and teaching aids) can contribute to the development of independent research activities of students, increase their cognitive and professional interest. The article analyzes requirements for existing educational materials that can be used to improve the information and educational environment of the university. Specialized software tools for creating electronic textbooks are considered, the advantages and disadvantages of electronic textbooks are investigated, and the priority functions of software tools used in universities are described.

1 Introduction

The implementation of information systems and technologies has changed the information and educational environment of the university, in which electronic learning tools are widely used. Electronic textbooks are one of the frequently used teaching aids [1, 9]. In the current period of social development, information technologies are used in all human activities and form a global information space. An integral and important part of these processes is the informatization of education.

Currently, the learning process at universities occurs in the information and educational environment (IEE), which is based on a variety of educational resources: electronic libraries, video and online courses, electronic textbooks (ET). The electronic textbook is a digital learning tool that present a subject or part of it, ensures the completeness of the didactic cycle of the learning process, creates an individualized educational environment.

The relevance of the implementation of modern electronic resources is due to the emergence of a number of teaching problems, including:

- the lack of educational literature;
- the voluminous theoretical part with a large number of hard-to-remember terms;
- insufficient activity of students.

With a large number of disciplines, it is difficult for a student to prepare for and pass exams.

The use of new information technologies in the education system can

- improve the mechanisms for managing the education system based on the use of automated data banks of scientific and pedagogical information, information and methodological materials, and communication networks;
- improve the methodology and strategy for selecting the content, methods and forms of training that can develop the personality of a student in digitalized society;
- create methodological training systems focused on the development of the intellectual potential of the trainee, on the formation of skills to acquire knowledge independently, to perform information-educational, experimental-research activities, independent activities for information processing;
- contribute to the creation and use of computer testing, diagnosing, controlling, and evaluating systems.
- Improving the information and educational environment of the university creates new requirements for improving the efficiency of its main components, in particular for electronic textbooks [1, 3, 6, 7].

2 Materials and Methods

At present, there are several requirements for modern teaching aids, which should be focused on enhancing student's independent work and motivation to master the subject. They should be accessible to all those who wish to obtain full-fledged education; provide training for high-class specialists; make extensive use of modern

* Corresponding author: vshkoda@mail.ru

means of telecommunications and the latest information technologies.

Speaking about the possibilities of IT for the educational process, many researchers emphasize the following aspects:

- unlimited possibilities for collecting, storing, transferring, transforming, analyzing and using information;
- increasing the availability of education with the expansion of forms of education;
- ensuring the continuity of education and advanced training throughout the entire active life;
- development of personality-oriented learning, additional and advanced education;
- support of the educational process (virtual schools, laboratories, universities, etc.);
- enhancement of the activity of subjects of the educational process;
- creation of a unified information and educational learning environment;
- independence of the educational process from the place and time of training;
- improvement of the methodological and software of the educational process;
- possibility of choosing an individual learning path;
- development of an independent creative personality;
- independent search activity of students;
- enhancement of the motivation to learning, etc. [10].

There is no doubt that the IT possibilities in the reorganization of the educational process are impressive and provide several activities for the teacher.

At the same time, there are several problems, including:

- the lack of theoretical foundations for using computer technologies;
- the lack of theoretical substantiation of technologies for the development of software and methodological support for learning in modern information environments;
- the lack of theoretically substantiated methods of complex application of network computer technologies of training and organizational and methodological support of independent cognitive activities.

Electronic educational resources are one of the most valuable components of the educational information environment. It is in educational resources that the content of the educational process is concentrated. The importance of electronic resources in the educational process is much greater than that of conventional manuals, since new educational technologies imply a reduction in personal contacts between the teacher and the student with an increase in the share of self-study. Therefore, e-learning materials take on the support of many learning components, which are provided by face-to-face communication between the teacher and the student.

Digital educational resources are digital photographs, video clips, static and dynamic models, virtual reality and interactive modeling objects, cartographic materials,

sound recordings, symbolic objects and business graphics, text documents and other educational materials used in the educational process [10]. Thus, the digital educational resource is a specific digital product that implements IT and is intended for use in education.

Creating a high-quality electronic textbook is a long process, very laborious and requiring investment. It is necessary to have a well-coordinated team of qualified specialists: an author, a web designer, a programmer, an artist and a psychologist.

If the development of an electronic manual does not require a large team of specialists, it is advisable to use simpler methods for creating electronic textbooks.

The effectiveness of e-learning depends on the technology used. The capabilities and characteristics of e-learning technology should ensure the maximum efficiency of interaction between the student and the teacher within the EE system. Difficult-to-use software complicates the perception of educational materials and causes a certain rejection of the information technology in education [2].

The electronic version of the textbook should be different from the classical one. It is necessary to systematize the requirements to electronic textbooks. This is especially important if the textbook is intended for use in the distance education (DE) system, both with the use of case technology and Internet network technology.

There are two types of electronic textbooks: autonomous and non-autonomous. The former ones do not imply the use of software tools, except for the operating system. The second type of electronic textbooks imply the use of certain software products. Each type has its own advantages and disadvantages.

The distance education system involves the active use of computer Internet technologies. Electronic textbooks of the second type are best created using the HyperText Markup Language (HTML). Since the platform is known, it is worthwhile to take a closer look at the possibilities and features of presenting documents in HTML format. Possibilities of formatting the text in HTML files are inferior to the possibilities of word processors. In addition to these formatting restrictions, there are also restrictions related to the bandwidth of communication lines, several types of browsers used, and possible technical limitations of end-user computers.

To improve the quality of an electronic textbook, the main factor is content. But recently, software has become especially relevant. This applies to military universities due to the transition to the use of domestic software systems [2, 3, 5].

To create electronic textbooks, programming environments, multimedia tools, hypertext and hypermedia tools, and special software tools are used. If qualified IT specialists are needed to create electronic textbooks using the first tools, for special software tools there are enough specialists who can work with these environments. Therefore, special software tools are mostly used for creating electronic textbooks [1, 2, 4, 8].

For the effective use of DER in the educational process, the teacher should work with this software tool. There is no doubt that the development of full-fledged software products for educational purposes requires the

joint work of highly qualified specialists: psychologists, teachers, computer designers, and programmers. Many large foreign firms and a number of domestic software manufacturers finance projects aimed to develop computer educational systems, digital educational resources in educational institutions and conduct their own research in this area [10].

In the market of modern, the following software products are used for creating electronic textbooks:

SunRav, eBook Maestro, Dr.Explain, Adobe Captivate. These tools allow you to use all the possibilities of modern multimedia formats: audio and video files, images; create documentation in the form of EXE files, CHM, HTML, PDF and other formats.

Special software tools have a number of advantages and disadvantages. Table 1 provides a comparative analysis of their characteristics.

Table 1. Comparative analysis of special software tools for developing electronic textbooks.

Software	SunRav	eBook Maestro	Dr.Explain	Adobe Captivate
Features				
Photo support	+	+	+	+
Video support	+	+	+	+
Web support	+	+	+	+
Script support	+	+	+	+
Adaptability for mobile devices	+	-	+	+
Version for Astra Linux	+	-	-	-
Ability to convert to word/pdf	+	-	+	+
Free version	-	+	+	+
Efficiency of technical support	Several hours	-	Several hours	Long-term
License price	>=3 120 rub	>=1 420 rub	>=14 000 rub	>=33 000 rub

3 Results and Discussion

SunRav BookOffice is a software package for creating electronic books and textbooks. It consists of two programs: SunRav BookEditor used for editing books and textbooks and SunRav BookReader used for viewing books and textbooks. Any book can consist of an unlimited number of chapters, sections and subsections.

E-education is a system that has a lot of tools for creating lecture materials in electronic format, including forums, messaging, graphic material, programs for creating tests.

Dr.Explain is software for creating help files, documentation, and online manuals in CHM, PDF, DOC, and HTML formats.

Adobe Captivate is designed for creating educational multimedia resources. Its main advantage is that users do not need to have programming skills to develop learning resources. Thanks to its intuitive interface, it is not difficult to master the program.

The SunRav software environment is most effective and multifunctional. However, it has its drawbacks: data import (formulas), video support, etc. Despite this, the SunRav software environment is widely used in universities to create electronic textbooks. The use of this environment is especially important in military universities, for which one of the main factors is the

availability of a version for the Astra Linux operating system.

This is a package for creating and viewing e-books and textbooks, consisting of two programs: SunRav BookEditor and SunRav BookReader. Using the package, you can create EXE files, in CHM, HTML, PDF. Books can be presented in all multimedia formats: audio and video files, images (including animated ones), flash, any OLE objects, etc.

4 Conclusion

When designing an electronic textbook for university students, we proceed from the principles of selecting materials based on the cultural concept of the content of education and the competency-based approach to the learning process, structure this material based on the graph-oriented approach and the principle of combining independent learning activities of students with pedagogical assistance and provide for functional units of the structure of an electronic textbook based on the scenario approach and the principles of adaptability. Using electronic textbooks in conjunction with printed textbooks can enhance motivation to learning [9].

The teacher, being a key participant in the informatization of education, designed to eliminate problems in the development of the education system, should understand IT possibilities of IT and cultivate the

need for continuous professional development, the desire for continuous learning.

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