

ICEST 2020
International Conference on Economic and Social Trends for Sustainability of
Modern Society

COMPARATIVE ANALYSIS OF DISTANCE LEARNING TOOLS

I. M. Gorbachenko (a)*

*Corresponding author

(a) Reshetnev Siberian State University of Science and Technology, 31, Krasnoyarsky Rabochy Av., Krasnoyarsk,
Russia, irinag105@mail.ru

Abstract

In today's world, getting an education is very important. To do this, various methods and methods can be used, including distance learning. The application of this form of knowledge acquisition requires the use of specialized software. Creating these programs can be done using software environments and wrappers for organizing training. Many of them have been developed. Moreover, these developments are not only foreign (for example, Adobe Acrobat, Macromedia Authorware, ToolBook II, Quest, and others), but also domestic (for example, HyperMethod, Docent, Prometheus, network shell "Orox", CADIZ). All of them have different capabilities and allow you to organize separate forms of classes. For example, they can work with multimedia and have modules for developing glossaries, tests, and other training elements. At the same time, the use of these tools is possible when conducting various forms of classes. The purpose of this work is to develop a methodology for assessing the applicability of environments and shells for each specific subject, discipline.

2357-1330 © 2020 Published by European Publisher.

Keywords: Distance learning, software tools, comparative analysis.



This is an Open Access article distributed under the terms of the Creative Commons Attribution-Noncommercial 4.0 Unported License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

1. Introduction

In the modern world it is very often difficult to get an education:

- it is necessary to travel long distances to the place of study;
- high cost of training, because it requires the use of expensive equipment and other things.

The use of distance learning can help solve these problems. For its implementation, not only technical means (computers, video projectors, etc.) should be used, but also complexes of programs for special training purposes.

Purpose of training programs:

- give the student the opportunity to familiarize themselves with the content of the course;
- to implement the processes of self-training of students using the computer;
- conduct independent training practical work;
- create conditions for the teacher to develop and update the texts of lecture notes, methodological developments in order to further edit them for the changing educational process.

2. Problem Statement

Creating automated training systems can occur in two ways: use ready-made development tools or do programming itself (i.e. choose a programming language as the base development tool). Each of these approaches, when applied in its purest form, has its own advantages and disadvantages. In the first case, effort and time are saved, since many typical operations are automated, but the developer's freedom of action is limited by the capabilities of the development tool. Direct programming is a much more time-consuming process, but there are significantly fewer restrictions in implementing what is intended.

When using ready-made learning environments, it is very difficult to choose the appropriate software tool. Some have the ability to work with multimedia files, others have the ability to use virtual technologies, and more. This article provides an example of evaluating the applicability of various software tools for distance learning tasks.

3. Research Questions

Theoretical and practical aspects of distance learning are considered in the scientific works of A. A. Andreev, V. A. Kanavo, E. S. Polat, V. I. Soldatkin, A.V. Khutorsky and others.

A study of the application of training systems and their creation was done by many scientists in Russia and in other countries. In particular, Khachaturova (2017), Alesheeva (2018), Barannikova (2018), Kudinov (2008), Karpenko et al. (2015), Verbitsky (2015), Resalat (2020), Krasnova et al. (2014), Woolf (2009), King et al. (2001) and others.

4. Purpose of the Study

In modern conditions of modernization of the education system, active cognition, self-education, and distance learning play a key role (Nabiev, 2014). The use of information technologies in education has helped to improve the level of education and its effectiveness. The rapid development of telecommunications has influenced the improvement of educational technologies (Karpenko, et. al., 2015). The most promising of them is the technology of distance learning.

Distance learning can now be considered as an innovative form of learning that allows you to get knowledge over the Internet under the control of a teacher-tutor and the use of which provides a quick and flexible adaptation to the changing needs of the student (Barannikova, 2018).

Distance learning is a set of technologies (Kravtsova, 2015) that provide: a) the transfer of the necessary amount of educational material to students, b) the possibility of interactive interaction of participants in the educational process, c) the possibility of independent work of students in the learning process (Volzhina, 2008).

This requires the use of software tools in accordance with the tasks and goals of training (Devterova, 2010). And this is not always an easy task when there is a wide variety of systems for distance learning (Alesheeva, 2018).

5. Research Methods

Training systems include software packages that allow you to master the training material yourself (Prigozhina & Trostina, 2017). They usually include a textbook, a task book, a reference book, a laboratory workshop, and tools for monitoring the assimilation of knowledge (for example, test tasks, questionnaires) (Khachaturova, 2017).

Currently, ready-made tools for the development of training programs that allow to implement the first approach to varying degrees have become increasingly available (Salikhova, 2015). Moreover, these developments are not only foreign (for example, Adobe Acrobat, Macromedia Authorware, ToolBook II, Quest, and others), but also domestic (for example, HyperMethod, Docent, Prometheus, network shell "OROKS", CADIZ).

They can be divided into three groups:

- computer-aided design systems for computer-based learning tools,
- author systems,
- educational process management systems (Karpenko, et. al. 2015).

More specialized system software packages, software tools, focused on creating products for educational purposes. Here is a brief description of some of them.

5.1. HyperMethod

The first one is HyperMethod. Released by the Russian company "Hypermetod" (Moscow, web-site - <http://www.hypermethod.com>).

HyperMethod is a Suite of information system development tools that includes several software components and functions in the Microsoft Windows operating system environment. HyperMethod allows you to develop custom information systems without resorting to programming in the classical sense of the word.

Thanks to the hypertext concept that is the basis of the HyperMethod package, you can use it to develop information systems. At the same time, it is possible to have a single interconnected and structured database, establish multiple connections between different, heterogeneous elements (text, tables, graphics, video, sound, databases)

The main features of the package HyperMethod: automatic placement of links in the documents (dynamic link) for a given developer rules; the ability to set a new kind of dynamic relations of the type "request-query" between the different information objects of the application; availability of automated tools create and maintain the structure of the developed information system; automation of the validation process and analysis of the structure created by information systems and others.

The basis for creating a training complex using this program is made up of structural and functional schemes, i.e. schemes that reflect the structure of the training complex and resemble block diagrams of algorithms.

5.2. eLearning Office 3000

The next package is eLearning Office 3000, which is released by the Saint Petersburg branch of the open society Institute and Hypermetod company (website- <http://www.hypermethod.com>). Training courses created using it can be placed on the Internet on the free server of the Training center (www.elearn.ru).

This software tool provides the creation of all components of distance courses: educational material in multimedia form; interactive testing systems; a full-text search engine for the textbook material and means of communication with the Training center. It is distinguished by a friendly interface and maximum automation of work by providing the developer with ready-made course prototypes, template and style libraries, a built-in test creation system, automatic creation of hypertext links, and a number of other features.

The program is based on the use of WEB-CD technology, according to which the main content of the textbook is delivered on a CD, and the updating of educational material, operational interaction with the University and teachers, knowledge testing and distance seminars are carried out using Internet technology. The interaction between the student and the teacher can be carried out using e-mail. If there is no Internet connection, the course can be taught offline on a standard multimedia computer.

5.3. eLearning Office 3000

Another software package released by one of the leading companies in the United States - Microsoft Corporation (website - <http://www.microsoft.com>). This is the Microsoft FrontPage program, which is part of the Microsoft Office software Suite.

This software product is based on hypermedia technology, just like the previous one.

FrontPage is a full-featured tool of WYSIWYG technology (what you see is what you get) for creating Internet sites, providing users with all the tools to develop a site, control its operation and manage

it. It is focused on the minimal use of coding, on creating a training complex without the need for complex programming.

In addition, the version of FrontPage 2002 has the ability to manage the web site, in particular, you can track how users access the site and how they work with it. In this version, there is a Usage (traffic Analysis) function that allows you to display a list of site users, how they found it, and which pages were visited more often than others.

5.4. eLearning Office 3000

The latest software product – Dreamweaver, released by one of the US companies - Macromedia company (website - <http://www.macromedia.com>).

This software product is a unified environment for the design, development and administration of professional websites and applications. It combines visual markup tools with fast web application development and powerful text editor features. You can use special buttons and programming tools to create menus.

The product includes database support tools, code samples, and design templates, including examples of site structure, forms, ready-made functions in JavaScript for creating interactive web pages, and site configuration wizards.

6. Findings

Table 1 shows a comparative characteristic of some tools for creating training courses, and table 2 shows the possibility of using these tools to implement various training methods.

Table 01. Comparative characteristics of some tools for creating training courses

Characteristic	eLearning Office 3000	FrontPage	Dreamweaver	HyperMethod
Manufacturer	The Company "HyperMethod»	Microsoft Corp.	Macromedia	The Company "HyperMethod»
Work with graphics	+	+	+	+
Work with sound	+	+	+	+
Working with multimedia files	+	+	+	+
Creating control buttons	-	+	+	+
Configuring control buttons	-	+	+	+
Ability to ask questions during the lecture	-	-	-	-
Ability to automatically evaluate the response	+	+	+	+
Establishing links between lectures	+	+	+	+
Ability to set time limits for reading a lecture	-	-	-	-
Setting time limits for answering questions	-	-	-	-

Whether there is a function for determining the response time to questions	-	-	-	-
Availability of information security tools	-	-	-	-
The creation of dictionaries (glossaries)	+	+	+	+
Easy operation	+++++	++++	++++	+++
Ability to work on a local computer network	-	+	+	+
Work on the Internet	+	+	+	+

Table 02. Comparison of the applicability of some tools for creating training courses when implementing various training methods

Characteristic	eLearning Office 3000	FrontPage	Dreamweaver	HyperMethod
Conversation	-	-	-	-
Lecture	+	+	+	+
Practical training	-	+	+	-
Discussion	-	-	-	-
Demonstration	+	+	+	+
Illustration	+	+	+	+
Testing	+	+	+	+
Working with reference books and dictionaries	+	+	+	+

7. Conclusion

As can be seen from the above description and comparison of features, the software products considered can be used for lectures, both in Humanities and technical disciplines (due to the ability to work with text, graphics, music, multimedia). The use of the considered software systems is not always possible for practical training due to the large amount of programming or the lack of such features as such. In this regard, we can recommend these tools for creating software packages with additional reference material or as a tool for creating software tests.

References

- Alesheeva, L. N. (2018). *Intellektual'nye obuchajushchie sistemy* [Intellectual training systems]. *Bulletin of the University*, 1-7. [in Rus.]
- Barannikova, V. (2018). *Distancionnye tehnologii v obrazovanii* [Remote technologies in education]. Infowork, [in Rus.].
- Devterova, Z. R. (2010). *Sovremennye podhody k organizacii i upravleniju distancionnym obucheniem* [Modern approaches to the organization and management of distance learning]. *Humanization of education*, 1-6. [in Rus.]

- Karpenko, O. M., Abramova, A. V., Shirokova, M. E., & Basov, V. A. (2015). Obzor sredstv organizacii distancionnogo obuchenija i perspektivy ih razvitiya [Review of means of organizing distance learning and prospects for their development]. *Distance and virtual learning*, 2, 4-24. [in Rus.]
- Khachaturova, S. S. (2017). Obuchajushchie sistemy v obrazovanii [Training systems in education]. *International journal of experimental education*, 3-2, 188-189. [in Rus.]
- King, F., Young, M., Richmond, K., & Schrader, P.G. (2001). Defining distance learning and distance education. *Educational Technology Review*, 9.
- Krasnova, T., Mikeladze, T. & Laine, J. (2014). Multimedia in foreign language teaching with adult learners. *Multilingualism in the educational space*, 1-4.
- Kravtsova, L. G. (2015). Sovremennye podhody k organizacii distancionnogo obuchenija studentov tvorcheskikh special'nostej [Modern approaches to the organization of distance education for students of creative specialties]. *Eurasian Scientific Journal*, 10, 1-4. [in Rus.]
- Kudinov, D. N. (2008). Perspektivy razrabotki avtomatizirovannyh obuchajushhih sistem [Prospects For the development of automated training systems]. *Modern problems of science and education*, 6, 46-50. [in Rus.]
- Nabiev, I. M. (2014). Perspektivy distancionnogo obrazovanija [Perspectives of distance education]. *Young scientist*, 2(61), 799-801. [in Rus.]
- Prigozhina, K. B., & Trostina, K. V. (2017). Virtual'naja obrazovatel'naja sreda kak sredstvo povyshenija konkurentosposobnosti obrazovatel'nyh programm vuza [Virtual educational environment as a means of improving the competitiveness of educational programs of higher education]. *Education and science*, 1-28. [in Rus.]
- Resalat, R. (2020). *What's distance learning?* Complete University Guide Limited.
- Salikhova, D. R. (2015). Organization of distance learning in Moodle. *Young scientist*, 6(86), 207-210.
- Verbitsky, A. A. (2019). Cifrovoe obuchenie: problemy, riski i perspektivy [Digital training: problems, risks and prospects]. *Electronic scientific journal Homo Cyberus*, 1(6). [in Rus.]
- Volzhina, N. V. (2008). *Organizacija samostojatel'noj raboty studentov v processe distancionnogo obuchenija* [Organization of independent work of students in the process of distance learning]. Altai University Press. [in Rus.]
- Woolf, B. P. (2009). *Building Intelligent Interactive Tutors*. Morgan Kaufmann.