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THEORETICAL ASPECTS OF THE USE OF ELECTRONIC EDUCATIONAL RESOURCES IN PROFESSIONAL ACTIVITY OF FUTURE TEACHERS OF TECHNOLOGY

IRYNA SMYRNOVA

Abstract. In this paper, we tried to determine the requirements for ESM, to study theoretical aspects of electronic educational resources in the professional activity of future teachers. The results created by the introduction of our course "Methodology development and use of electronic educational resources" for future teachers of technology ITOS in the process of professional specialty "Technology" in the educational process of higher educational institutions of Ukraine. The article states the rapid development of computer hardware and computer software, IT technologies have an opportunity to significantly develop the field of electronic educational resources. This is due to the emergence of global networks where information technologies have become the second paradigm, which is based on the current understanding of electronic educational resources. We determined that the dynamism inherent in information technology, enabling expectations of new approaches that will change the meaning of electronic educational resources.

Keywords: electronic educational resources (ESM), vocational training, professional activity, future teachers, future teachers of technology, specialty "Technology" higher educational institution (ITOS).

1. INTRODUCTION

Considerable interest in the development and use of electronic educational resources is the result of serious and largely justified by expectations of increased effectiveness of the educational process and the quality of education. With the rapid development of hardware and software it offers technologies the opportunity to significantly develop the field of development of electronic educational resources. This is primarily linked with the emergence of global networks and information technologies. These technologies have become second paradigm, which is based on modern ideas about e-learning resources. It is obvious that the dynamism inherent in information technology, making the expectation of new approaches that will change the concept of e-learning resources [2].

Analysis of recent researches and publications initiated solving this problem. Some aspects of the use of ESM in the educational process of secondary and higher educational institutions have become the subject of research of many scientists, both Ukrainian and foreign. The problem was researched by Y. Doroshenko, M. Zhaldak, N. Kalinichenko, N. Levshin, N. Morse, V. Urgence etc. Features of training sessions in universities were studied by V. Bykov, L. Bekir, I. Wojtowicz, P. Gorel,

G. Gurevych, I. Polat, A. Sysoeva, O. Spirin, etc. Features of development of electronic textbooks and manuals are reflected in the publications of V. Volynsky, A. Gorgia, L. Kartashova, V. Lapinsky, S. Sharov, etc.

Considerable interest in the development and use of electronic educational resources is the result of serious and largely justified by expectations of increased effectiveness of the educational process and the quality of education. With the development of hardware and software of computers and technology has an opportunity to significantly develop the field of development of electronic educational resources. This is primarily linked with the emergence of global networks and information technologies. These technologies have become second paradigm, which is based on modern ideas about e-learning resources. It is obvious that the dynamism inherent in information technology, making the expectation of new approaches that will change the concept of e-learning resources [4].

2. Analysis and Discussion

Analysing scientific works of modern times, stating that much attention is paid to transfer of properties that must characterize an electronic educational resource. We assume that e-learning resources is information, which can be represented in the form of text, graphics, audio, video formats or their combinations that reflect the particular subject area education and is designed to ensure that the process of human learning, formation of knowledge and skills.

The purpose of the study is to define the requirements of ESM, study the theoretical aspects of the use of electronic educational resources in professional activity of future teachers. We provide the results of the implementation we have created a special course "Methods of developing and using electronic educational resources future teachers of technologies in ITOS, in the process of professional training of the specialty "Technology" in the educational process of higher educational institutions of Ukraine [5].

We consider that e-learning resources must meet the following requirements: a high level of performance, proper decoration, the completeness of the material, methodological tools and technical performance, the didactic principles of the logic and sequence of presentation of data. Of course, e-learning resources can be stored on any electronic media, or posted in the web space LAN or WAN. Most of them are published on the Internet, making them available for use in the educational process, the classroom technologies. This enables the teacher [2]:

- significantly to improve the theoretical understanding of the discipline "Technology";
- to expand training opportunities through the application of a variety of forms, types and ways of presenting theoretical, practical, reference material on the subject;
- to organize effective training activities for independent learning, and skills of students;
- to diagnose the intellectual capabilities of students, and to determine the level of their academic achievements, commitment to a specific activity;
- to manage educational process in the classroom technology to automate the process of monitoring the results of learning, training, testing;
- to generate jobs, depending on the intellectual level of each student and previously acquired experience;
- to provide conditions for self-learning activities self-study, self-development, self-improvement, self-education, self-realization;
- to work in a modern environments and ensure the management of information data flows.

It should be noted that the most active use of electronic educational resources is observed in the practical part of the lesson. This trend is explained by the fact that the teacher has to perform a large amount of routine work on the formation and verification of individual practical tasks, and the use of electronic educational resources gives him the ability to automate such activities. Theoretical part of the lesson, the use of electronic educational resources is possible, for example, through the implementation of project presentation on the proposed topics. Despite the obvious pedagogical benefits, the use of electronic educational resources in the classroom technology is somewhat difficult.

The main reasons for this phenomenon we believe are:

- lack of preparation of modern teachers to the use of electronic educational resources in the presentation of theoretical material;
- shortage of educational resources adapted for effective use in systematic training activities;
- low quality of existing educational resources.

In this regard, it should be noted that the quality of the resource is its most important characteristic that determines the effectiveness, readiness and adaptability teaching resource to use it in training. Because the use of high-quality electronic educational resource the student an opportunity to learn the material at a convenient pace, studies and researches, to carry out training for acquiring practical skills, to organize self-control. Usually, for the organization of self-study training material or when conducting current and final control can be used the same educational resource.

Pedagogical practice shows that today more and more educators use those educational resources that are designed for monitoring and testing of trainees in the learning process. This process is due to the fact that these resources significantly relieve the pedagogical workers from a large amount of work on the formation of multiple individual practical tasks and monitoring their implementation. In addition, the use of constant control of students knowledge significantly increases motivation. Development of new electronic educational resources has led to the need to ensure high quality at all stages starting from design and ending with their introduction into the educational process. It is impossible not to draw attention to the fact that of great importance to obtain a quality product acquires a deep relationship between the quality of the developed electronic educational resources and the quality of the technologies of their development costs on their development [10].

At the present stage of implementation of ESM in the educational process of secondary school teacher of technology, teacher of Informatics, not only the use of educational resources, but also develop them. After analyzing the quality of such resources, we can conclude that the problem of selection and correct presentation content material in them is unfinished. Similar remarks you can specify the structure of the interface and visual presentation of educational material, in our case, on the subject of “Technology and technical education”. These shortcomings are explained by the fact that the teacher is not getting in the development of educational resources with sufficient training.

To overcome the above mentioned difficulties, the author created a special course “Methods of development and use of electronic educational resources” which was held at the base. Drohobych state pedagogical University Ivan Franko, the pilot we implemented at the Institute of physics, mathematics, Economics and innovative technologies. This course studied by students of 4th courses of the specialty “Technology education”. Throughout the course allocated 54 hours, including 16 hours in lecture theatres, equipped with projection equipment (laptop, screen, projector) and 16 hours of laboratory classes in the computer lab, 22 hours of them being submitted for independent work. The aim of the course was to teach students to use and develop educational resources. As a result of the course, the students received knowledge on [9]:

- the concept of e-learning resources;
- classification of electronic educational resources;
- types of educational web-sites;
- search and selection of electronic educational resources on the Internet;
- the concept of quality of educational resources;
- requirements for the development of electronic educational resources;
- use of educational resources;
- various applications for developing e-learning resources and educational web resources;
- web technologies that can be used for educational purposes.

As a result of the course students will have the ability:

- search electronic educational resources of the Internet;
- to make a selection of electronic educational resources of the Internet;
- to distinguish educational websites from other sites on the Internet;
- to perform analysis of electronic educational resources and to determine their quality;

- convert, save and send educational resources;
- to use modern web technologies for educational purposes;
- use the different application programs as tools for the development of educational resources;
- to consider the requirements for electronic educational resources during their development;
- to use the educational resources in the classroom;
- use of educational resources for self-education.

In accordance with the program of a special course "Methods of development and use of electronic educational resources" the study completed by the preparation and defense of the project on the selected theme from the school course "Technology". All the projects of the students are published on the websites of the subordinate departments, or on our online "Interactive system ESM", which is by e-mail http://smirnova.eor.by/.

Fig. 1. Interactive system ESM.

The process of performing a project on "Technology" is carried out in several stages: 1) choice of the theme of the project; 2) search, analysis and selection of electronic educational resources on the topic of the project; 3) develop components of educational resource (outline of the lesson, practical assignments, tests, instructional videos, etc.); 4) to publish educational resource on electronic media and in local or global network; 5) presentation and defense of the project. Before selecting the topic the students are encouraged to review the programs for secondary schools of the discipline "Technology" and filter out topics in the study of which it is possible to effectively use e-learning resources. After that, each student announces the selection of a topic on the forum, justifying it and if agrees, receives confirmation from the teacher. In the second phase, students carry out search, analysis and selection of necessary educational resources. On the websites of their institutions in the section "students" each student has their own partition (same name as the theme of the project) in which he publishes the results of its activities. Publication of articles students on the websites using the technology web 2.0. [8].

It should be noted that today this technology is very popular among the Internet users due to the simplicity and ease of developing web content. If earlier for the development and deployment of data in the network need to know the HTML language, but now it is not mandatory. For example, the drafting of an article on the website is done in a text editor that is integrated into the browser. The text editor has all the necessary tools for developing, editing and formatting text and also allows you to insert picture, flash movie, table.

Web services are a technology with which in a single web project you can use software applications more. For example, a training video is placed in the distribution system video content YouTube http://ru.youtube.com/ which is used for playing multimedia content, integrated into the browser player. The address of the player along with the content (instructional video) can be copied and placed in the relevant article on the website. After that training videos can be viewed directly on the website, which will be played by the player using the browser, the player has control buttons with which to stop a training video or to reproduce it, and to increase or decrease the sound volume.

In the third stage are developed components of the educational resource with the help of these applications:

- text editor (to design texts: summary of the lesson, practical tasks, tests, training videos, etc.);
- graphic editor (for creating and editing images that accompany the educational material);
- audio editor (edit audio files and record with the microphone);
- program for recording images from the screen;
- other programs.

For the development of the texts use a free text editor AbiWord, which for the system services and an interface like MS Word.

For developing and editing images we use free graphic editor GIMP. The software supports raster graphics and partly vector. In addition, you can create animated images.

To edit audio files we use free audio editor Audacity. You can work with formats such as WAV and MP3. With this program you can also record from microphone, line-out, and other sources [4].

To develop a training video free editor UV Screen Cameras were used. Using this editor you can record all the action happening on the screen and save in formats such as uvf, exe, swf, avi.

After all components of the development resource, they must be organized in a unified educational web-resource. To do this, use a free program exe., what is the modern XHTML editor, which you can use to create modern electronic educational resources in the following formats: html, txt, SCORM, IMS content package. Another important point is that with this program you can create different types of tests.

In the next step, after learning resources ready, students write it on electronic media and publish in local or global network. During the project each student conducts a fragment of the lesson with the use of educational resources. The study of this course will improve the theoretical and methodological training of future teachers of technologies in the field of development and use of educational resources, and this, in turn, will improve the level of information culture.

Today it is quite obvious that in the educational process of any educational institution tries introducing new forms of learning, or otherwise those associated with information technology. Teachers have new opportunities for active use as ready electronic educational resources, created by teachers. In this regard, it should be clarified that electronic learning resources, usually referred to as learning materials for play which used electronic devices. In the most general case to e-learning resources we include educational videos, and audio for playback which is quite a household tape recorder or CD player. At the same time, it should be noted that the use of multimedia computer technology in the classroom has significantly expanded the possibility of bringing educational information by combining single-user product text, graphics, audio and video, animation, interactivity and opportunities for user feedback.

Analysis of the available pedagogical experience shows that conventionally, the use of computer in the classroom technology can be divided into three main stages:

The first phase of computer support lessons. Here the computer usually only use the teacher as a renderer lesson. For work in class the teacher and students enough to be able to work in standard Microsoft Office programs. Lesson practice a speech teacher with a computer, projector, sound speakers, recently they added an interactive whiteboard. Often in the educational process of use Microsoft PowerPoint as a software shell in which you create a multimedia presentation [3].

The second stage – the computer support of classroom technology. At this stage, in addition to using the computer as an effective means of providing information, the computer can be used by students as a means repetition of previously learned material (for example, the device of the machine, properties of materials, the choices of decorative finishes, assistance in the selection of the object of labour for creative work, etc.). Also the computer can be given the current control of students ' knowledge, for example – with the purpose of admission of the student to work on the other machine, control of safe work practices [5].

The third stage – the use of modern computer programs in education. A feature of this stage is to conduct technology lessons with all students work on computers under the guidance of a teacher, which of

course is not always possible due to the nature of the subject "Technology". But with timely lesson plans and training schedules, some lessons may be held at the offices of computer science.

Consequently, the use of e-learning resources in the classroom technology provides significant advantages in comparison with other technical means of training and has the following features [6]:

1) multimedia – the presentation of the material makes the visualization of the holistic unavailable image at a comfortable pace, sequence and form, which is particularly effective;

2) navigation – individualisieren training, essential for the solution of educational tasks and repetition in preparation for the inspection;

3) performance frees you from the routine and creates an information culture by automating the search in large databases, calculations, presentation of results;

4) modeling – makes up for the lack of information and equipment in study and research in public and industrial processes, modeling of networks and organization of virtual laboratories;

5) interactivity – replaces the prompt response of teachers to self-study, individual training and monitoring save the results to a reasonable and objective assessment of learning;

6) communication – using the network allows communication of students (pupils) with a teacher, outside consultants or remote equipment.

Teaching effectiveness is the following property of electronic educational resources as interactivity. Under the interactivity is the ability of information and communication systems to actively and adequately respond to any user action in the active mode. Online resources provide an opportunity to greatly intensify training sessions, to involve each student in active educational and research process. So, there are four levels of interactivity, developed in my dissertation, which is depicted in Fig. 2.

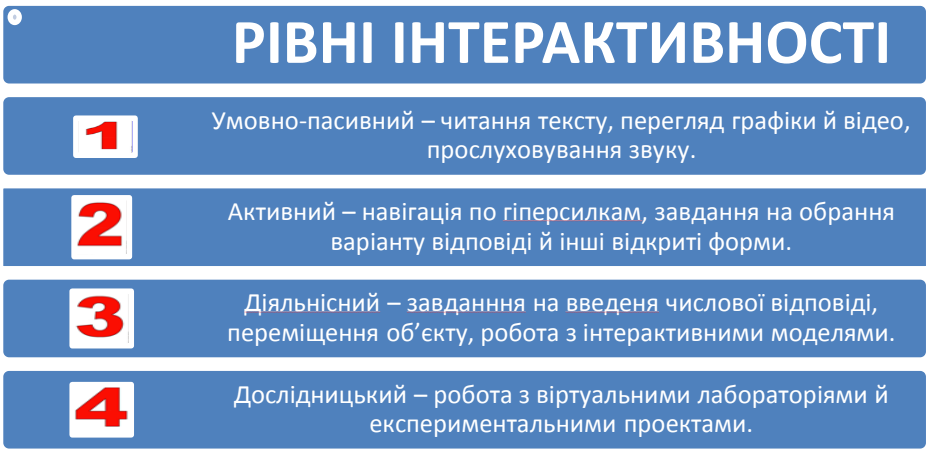

Fig. 2. The interactive information and communication system.

According to our experts, this form of training allows to increase learning efficiency by more than 50%, to increase the objectivity of students' knowledge control — by 20-25%.

Summarizing, we note that the purpose of the ESM is a new generation of qualitative and quantitative breakthrough in the field of it to support learning through the provision of enhanced access.

The task of creating the ESM is:

1. Unification to the appropriate standard.
2. High level multimedia.
3. The creation of favorable conditions for independent work on academic material that allows the student to choose the most convenient place and time and pace of learning.
4. Greater individualization of learning, and providing conditions for its variability.
5. Ability to: interact with models of the studied objects and processes; with the virtual images of the studied objects and phenomena that represent unique media information media;automated control of knowledge, abilities and skills.

6. Ensuring the economic availability of state financing for the creation of the ESM of the new generation. Easy download is due to the minimum size of the resource.

Consequently, the use of ESM in the educational process not only improves the quality of education of students but also increases the level of professional competence of teachers through the development of information technology and it-competence, leading to the expansion of the information field of the teacher, the formation of new relationships between the subject that forces us to rethink previously established notions about the purpose of studying the subject and vision of its place in the process of forming a holistic picture of the world [1].

We find that e-learning resources is information data presented in the form of text, graphics, audio, video formats, or combinations therefore, reflecting the specific subject the education industry and is designed to ensure that the process of human learning, formation of knowledge and skills.

3. CONCLUSIONS

We discovered that e-learning resources must meet the following requirements: a high level of performance, proper decoration, the completeness of the material, methodological tools and technical performance, the didactic principles of the logic and sequence of presentation of data. Of course, e-learning resources can be stored on any electronic media, or posted in the web space LAN or WAN. Most of them are published on the Internet, making them available for use in the educational process, the classroom technologies.

Pedagogical practice shows that the most active use of electronic educational resources is observed in the practical part of the lesson. The use of electronic educational resources in the theoretical part of the lesson possible through the implementation of project presentation on the proposed topics. The most important characteristic of electronic educational resources is their openness and adaptability to use in training. To obtain a quality product ESM is possibly subject to a profound relationship between the quality of developed electronic educational resources and the quality of the technologies of their development costs on their development.

According to the analysis of practice of using the ESM, we can conclude that the problem of selection and correct presentation content material in them remains under-researched. Similar observations can be attributed to structure, interface and visual presentation of educational material. These shortcomings stem from the lack of proper training of future teachers of technologies in the development of educational resources.

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Address: Iryna Smyrnova, Institute of Vocational Education and Training of the National Academy of Pedagogical Sciences of Ukraine, Vito-Litovskiy Line 98-A, Kiev, 03045, Ukraine.
E-mail: phd.smyrnova@gmail.com.
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Смирнова Ірина. Теоретичні аспекти використання електронних освітніх ресурсів у професійній діяльності майбутніх учителів технологій. *Журнал Прикарпатського університету імені Василя Стефаника*, **4** (1) (2017), 140–147.

У статті визначено вимоги до електронних освітніх ресурсів (ЕОР), обґрунтовано теоретичні аспекти використання ЕОР у професійній діяльності майбутніх учителів. Представлено результати впровадження авторського спецкурсу "Методика розроблення та використання електронних освітніх ресурсів" майбутніми вчителями технологій в процесі професійного навчання спеціальності "Технології" у навчально-виховному процесі вищих навчальних закладів України. У статті зазначено, що з розвитком апаратного та програмного забезпечення комп'ютерів, ІТ-технологій з'явилась можливість суттєво розвивати сферу розроблення електронних освітніх ресурсів. Це пов'язано з появою глобальних мереж та інформаційних технологій, які стали другою парадигмою, на якій базуються сучасні уявлення про електронні освітні ресурси. Визначено, що динамічність, притаманна інформаційним технологіям, уможливлює очікування нових підходів, які будуть змінювати зміст електронних освітніх ресурсів.

Ключові слова: електронні освітні ресурси (ЕОР), професійне навчання, професійна діяльність, майбутні вчителі, майбутні вчителі технологій, спеціальність "Технології", вищий педагогічний навчальний заклад (ВПНЗ).