The Role of Smart Technologies in Training Future Specialists

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Summary

The article discusses the use of smart technologies in the training of future specialists. Today, learning using smart technologies is becoming a new educational standard, where information is presented in a logical sequence, computer training systems have powerful functions for the educational process. The functions of smart technologies are highlighted. It is noted that smart technologies are successfully used in the field of education and professional training. The concept of "smart education" is characterized. Smart education is an educational paradigm that underlies a new type of education system. The implementation of the smart education paradigm is aimed at the process of obtaining competencies and competencies for flexible and adapted interaction with the social, economic and technological environment. Smart education should ensure that the benefits of the global information society can be used to meet educational needs and interests. A special place is occupied by computer-based educational multimedia systems that allow you to deepen your knowledge, reduce the duration of training, and increase the number of students per teacher. The main principles of smart education are highlighted. Improving the efficiency of training in a modern higher education institution is impossible without the introduction of smart technologies in the organization of the educational process.

Keywords:

smart technologies, education, professional training, multimedia systems, smart education, information society, technological environment.

1. Introduction

The socio-economic changes that are taking place in Ukraine set new tasks for education to revive the intellectual potential of the people, develop domestic science to the world level. One of the directions of implementing this goal is the progress of Education based on new concepts, the introduction of smart technologies in the educational process [4].

Now smart technologies are evolving at such a rate that often equipment becomes obsolete even before it is put into production. Software is also variable: new developments and competitive products are ahead of existing technical means, and users only learn about the capabilities of previous resources, not to mention the full development of their potential [1].

The word "Smart" is translated from English by the adjective smart and means everything that is successfully adapted to solving a specific technical or organizational problem. In other words, “Smart” is a property of an object that characterizes the integration of two or more elements in a given object that were not previously connected and provided using the Internet. For example, Smart-TV, Smart-Home, or Smart-Phone. The interpretation of the abbreviation Smart is interesting: S – Self-directed (focused on self-learning); M – Motivated (motivates active cognitive activity); A – Adaptive (adapted for the subject of Education); R – Resource Free (has free educational resources for access); T – Technology Embedded (provided by technologies) [3].

We have set a goal: to consider the use of smart technologies in the training of future specialists.

2. Analysis of recent research and publications

A comprehensive analysis of scientific research of Ukrainian and foreign scientists shows that the problem of training a modern specialist using smart technology is an

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urgent subject of research by many scientific schools and individual researchers.

R. Gurevich, M. Kademia considered the problem of improving the education system in higher education institutions based on the development of e-learning and the transition to smart education, the definition of smart education, the use of modern ICTs. The development of mass open online courses and their use in the educational process of higher education institutions, professional development of employees and their retraining, considered three components: technological, organizational, pedagogical, which are the basis for the implementation of smart education in higher education institutions [2].

Rogulska O., Tarasova O. noted the importance of creating a smart education system in Ukraine, which involves the use of smart technologies that have a significant number of advantages: they encourage the development of creative abilities, professional knowledge, and form critical thinking. It is determined that smart education is learning in an interactive educational space with the help of world content that is freely available. The possibilities and prospects of using smart technologies in the educational process of higher educational institutions of Ukraine are analyzed. It is proved that it is the development of information and communication technologies and the Internet that determines the need to introduce smart technologies into the educational process of higher education institutions. The possibilities of using a software and technology training complex based on SMART Board in the educational process are described [10].

Guzenko A. highlights the theoretical and methodological foundations of educational technologies, scientific and practical content of modern educational technologies, determinants of modern social and educational technologies and considers the latest approaches to modern management technologies [3].

Kuchai T., Kuchai O., Marinets N. reveal the essence of multimedia (electronic) textbooks that interest teachers and students. This is due to the fact that knowledge that provides a high level of professional qualification always changes quickly and often. Electronic textbooks allow you to track these changes, improving the level of training. The advantages of electronic textbooks are highlighted [7].

Kravchenko, T., Varga, L., Lypchanko-Kovachyk, O., Chinchoy, A., Yevtushenko, N., Syladii, I., & Kuchai, O. emphasize the many forms of innovations implemented in improving the professional competence of a specialist are listed: improvement (rationalization), modernization, innovation. Modernization of computer technologies, especially multimedia ones, is a necessary condition for the functioning of specialists in modern society, since specialists are at the center of the educational process, during the improvement of professional competence [5].

Plakhotnik, O., Strazhnikova, I., Yehorova, I., Semchuk, S., Tymchenko, A., Logvinova, Ya., & Kuchai, O. expose the importance of multimedia teaching tools, which are promising and highly effective tools that allow the teacher not only to present an array of information in a larger volume than traditional sources of information, but also to include text, graphs, diagrams, sound, animation, video, etc. in a visually integrated form [9].

Shchyrbul, O., Babalich, V., Mishyn, S., Novikova, V., Zinchenko, L., Haidamashko, I., & Kuchai, O. demonstrate that relevant concepts of media education, developed form an important basis for the modernization of education, which will contribute to the construction of an information society in the country and the formation of civil society. Distance learning is considered - the most democratic form of education that allows broad segments of society to get an education [11].

Tkach Yu., Petrenko T. reveal the role of multimedia systems that are now successfully used in the field of education and vocational training. A special place is occupied by computer-based educational multimedia systems that allow you to deepen your knowledge, reduce the duration of training, and increase the number of students per teacher [8].

Vasilyeva D. describes the method of working with a multimedia whiteboard, where the teacher has the opportunity to maintain constant contact with the audience, since he is not distracted by working with the computer and is constantly turned to face the students. If there is an additional device – a wireless electronic tablet – the teacher does not depend on the blackboard at all, moves freely around the audience, which contributes to closer interaction with each student, monitoring and correcting educational activities [12].

3. Research methods

To achieve the goal, the following research methods were used: theoretical: analysis, synthesis, comparison, systematization, generalization, modeling – analysis of psychological and pedagogical scientific sources and methods of professional training on the topic under study in order to clarify new research concepts.

4. Results and discussions

Today, learning using smart technologies is becoming a new educational standard, where information is presented in a logical sequence, computer training systems have powerful functions for the educational process. Modern approaches to the use of smart technologies in the educational process in higher education are based on two technologies, namely: multimedia and the internet system.

Let us describe the concept of "smart education". Smart education is an educational paradigm that underlies a new type of education system. The implementation of the smart

education paradigm is aimed at the process of obtaining competencies and competencies for flexible and adapted interaction with the social, economic and technological environment. Smart education should ensure that the benefits of the global information society can be used to meet educational needs and interests [2].

The function of smart technologies and multimedia technologies is that they use a source of new content information, take on separate functions of both the teacher and the student, and have the features of various types of visual representation. If interactive information is transmitted through a multimedia projector on an interactive whiteboard, the effectiveness of learning is significantly improved.

E-learning and distance education have started a new global phenomenon – smart education – this is learning in an interactive educational space using worldwide content that is freely available. This is not only a system of innovative technological solutions, but also a new philosophy of Education.

Smart education allows students to generate new knowledge and form the personality of a smart person who perfectly knows information and computer technologies for finding and analyzing information and creating innovations.

Smart education has a number of positive characteristics, in particular:

– versatility – ensuring compatibility with software developed for different operating systems, which allows you to provide equal learning opportunities, regardless of the devices used, ensuring the continuity of the educational process and the integrity of educational information;

– time and place independence, mobility, continuity and easy access to educational information;

– autonomy of the teacher and student due to the use of mobile devices for accessing educational information;

– relationship between individual and organizational goals of employers and educational institutions;

– assessment of changes in competencies – the effectiveness of the educational process is measured not so much by the acquired knowledge, but by the possibility of applying it in practice;

– flexible training in terms of the preferences and individual capabilities of students (the ability to customize training to individual parameters, in particular such as: initial knowledge, experience and skills; learning style;

– physiological and psychological states at each specific moment of training).

Thus, the goal of "smart" learning is to make the learning process most effective by transferring the educational process to an electronic environment. The approach that will allow you to "copy" the teacher's knowledge and provide access to it to everyone.

The widespread use of modern smart technologies is caused by a number of factors: increasing the speed of information and knowledge transfer; the need for dynamic adaptation of students and specialists to the environment and social changes taking place in it; the need to reform training systems in accordance with the requirements of the information society (increasing labor productivity; transparency and flexibility of educational processes; training in accordance with the needs and abilities of students.) [10].

According to A. Guzenko, the concept of "Smart" has the ability to respond more quickly to the requirements of the economy and the world. The development of the economy requires well-educated specialists at various levels, and the technization of modern life requires a certain level of literacy (in a broad sense) for all members of society. Most developed countries promote the Smart concept as part of the development of not only the education system, but also the economy as a whole. This concept is based on three main ideas:

1. Mobile access. It is necessary to ensure that all types of digital services can be received anywhere in the world, and these services should be directed to each user individually.

2. Creating new knowledge. No country can develop without constantly acquiring new knowledge, which in turn forms the basis for modernizing the national economy.

3. Create a Smart environment. The Smart environment allows you to stimulate the emergence of individual technological developments that can reach a level where the Information Technology Environment approaches natural intelligence and serves as one of the main ideas on which the idea of a "smart" economy is based.

Taking into account the above, we believe that such training will provide an opportunity to independently develop the individual educational and further professional growth trajectory of the student, as well as equate the level of applicants for education in urban and rural schools and open the way to the international educational space.

We emphasize that the smart education environment is a convergence of ICT and Internet infrastructure, that is, a fusion of online distribution of software and content in multimedia format. In this context, Smart technologies involve the use of computer systems and microprocessors to perform daily tasks and exchange information. In other words, the key aspects are the creation of a flexible and open learning environment using gadgets, open educational resources, and management systems.

The goal of smart learning is to make the learning process effective by transferring the educational process to an electronic environment. With the introduction of Smart technologies, conditions will be created for the implementation of the UNESCO – proclaimed leading principle of education of the XXI century "education for all" - "Life Long Learning (LLL)" [3].

Multimedia systems are now successfully used in the field of education and professional training. A special place is occupied by computer-based educational multimedia

systems that allow you to deepen your knowledge, reduce the duration of training, and increase the number of students per teacher. Improving the effectiveness of training in a modern higher education institution is impossible without introducing the latest forms of organizing the educational process. According to research by leading teachers and psychologists, one of the ways to implement this is the use of information and communication technologies. The teacher, using ICT, is able to intensify the educational process, make it more visual and dynamic [8].

The use of new technologies with "smart" or their reasonable use can determine the nature of a new type of Education. Let us list technological solutions for the field of Education, which are considered as smart: smart boards, smart projectors, software for creating and implementing educational content that has an interactive and communicative nature, as well as Social Media and Data Mining, which are used in smart education. Currently, there is a paradigm shift in the development of higher and secondary education around the world, which is associated with the emergence of massive Massive Open On-line Course (MOOC). They constitute large-scale interactive free educational courses through open access on the Internet.

In 2013, a new platform for MOOC was launched – NovoED (режим доступу: http//www.bing.com). The project was developed by specialists from Stanford University. The project presents a set of courses that the developers have made practice-oriented. They are characterized by: productive teamwork, project execution, increased communication between members of working groups, a new rating system and the responsibility of each participant for completing a common task, and the absence of tests. All these innovations should motivate students and pupils to learn and help them successfully master a holistic course.

MOOC was planned as a network project of leading higher education institutions in the United States, but it turned out to be so popular that it attracts an increasing number of higher education institutions from all over the world every month, including in the Asian region. In particular, in 2013, such universities as the University of Hong Kong (HKUx), Hong Kong University of Science &Technology (Hkustx), Kyoto University, Japan (KyotoUx), Peking University, China (PekingX), Seoul National University, South Korea (SNUx), etc. joined the EDX project.

In May 2013, the first European MOOC was launched. The project provided 40 free courses in 12 different languages. The courses were created by the European Association of Distance Teaching Universities (EADTU) (режим доступу http//www.eadtu.eu). Among the project partners are France, Italy, Israel, Lithuania, the Netherlands, Portugal, Slovakia, Spain, Great Britain, Russia, Turkey. In this regard, Joshua Kim emphasizes that each institution of higher education should not develop its own MOOC in full [2].

To improve the learning process, a tool such as a multimedia whiteboard is used. It is a universal technical tool for visual communication and learning, combining the characteristics of a regular whiteboard and the latest computer technologies. It is used not only to reflect what is happening on the computer, but also to establish the relationship between the teacher and the computer. Under certain conditions, this can be a “teacher – student – computer” interaction.

A multimedia whiteboard usually covers four components: a computer; a multimedia projector; software; and a special touch panel, which, in fact, is the whiteboard. The multimedia projector and touch panel are connected to the computer. The image from the computer monitor is transmitted via the projector to the panel. Touch to the touch surface occurs thanks to special markers or by touching with your fingers and is transmitted to the computer via cable or infrared communication. The applied pulses are read and interpreted by special software installed on the computer.

Multimedia whiteboards can be forward or reverse designed. Under the condition of direct projection, the projector is placed in front of the surface of the touch panel, and the teacher or student who is near the blackboard can partially cover some images. To prevent this from happening, the projector is hung from the ceiling as close to the board as possible, the lens is tilted down, and some distortions in the image are compensated using a digital correction system. If the reverse projection board, then the projector is placed behind the screen, working on the lumen. Such boards are more expensive, and their installation in the classroom requires additional space, but this reduces the negative impact of the projector on training participants.

Working with a multimedia whiteboard, the teacher has the opportunity to maintain constant contact with the audience, since he is not distracted by working with the computer and is constantly turned to face the students. If there is an additional device – a wireless electronic tablet – the teacher does not depend on the blackboard at all, moves freely around the classroom, which contributes to closer interaction with each student, monitoring and correcting learning activities. At any time, the teacher can hand over the wireless tablet to the student, who writes the answer without getting up from his seat. This encourages activity of students and contributes to their involvement in the learning process, enhances interaction with the teacher and optimizes local control of educational activities [12].

Let us highlight the basic principles of smart education:

1. Use of up-to-date information from the curriculum for solving educational problems. The speed and volume of information flow in the world and professional activities is growing rapidly. Training materials should be supplemented with real-time information in order to solve practical problems and work in a real situation.

2. Organization of independent cognitive, research, and project activities of students. This principle is key in preparing specialists for creative search for solutions to practical problems, independent information and research activities.

3. Implementation of the educational process in a distributed learning environment. The learning environment is currently not limited to the University territory or the learning management system (LMS). The learning process should be continuous, including training in a professional environment using professional activities.

4. Interaction of students with the professional community. The professional environment is important in the educational process. The use of ICT in the educational process provides an opportunity for all its participants to work in professional environments, create software products, participate in telecommunications projects, etc. The task of the university is to provide educational services in accordance with the needs and capabilities of students.

5. Flexible educational trajectories, individualization of learning. Training is carried out not only by students, but also by working citizens who want to gain knowledge, carry out their own retraining or advanced training. The task of the educational institution is to provide educational services in accordance with the needs of everyone who wants to study.

6. The versatility of educational activities requires providing many opportunities for everyone who wants to study in any educational program and courses in accordance with the capabilities of this institution, their own health, laboratories and social conditions [2].

Now computer technology is widely used in all spheres of human activity. The introduction of Information Technologies is due to the rapid development of Science, a qualitative increase in human capabilities and the volume of information that is constantly growing. Informatization has not ignored the education system, especially in terms of using not only computers and laptops, but also tablets, which are quite widely used in education.

Multimedia (electronic) textbooks are of interest to teachers and students. This is due to the fact that knowledge that provides a high level of professional qualification always changes quickly and often.

Electronic textbooks allow you to track these changes, improving the level of training. Among the advantages of electronic textbooks, it is worth highlighting the following:

– visual representation of the material (using color, illustrations, sound, video, animation, etc.);

– fast feedback (built in test systems allow instant control over the assimilation of material);

– interactive mode helps students independently control the speed of assimilation of educational material;

– regular correction of the textbook after the appearance of new data (the electronic textbook is located in a specific place in the virtual space, which millions of people have access to; in order to add or correct something, just make changes to one file and millions of people will have a corrected version of the old textbook);

– easy to use (only a local network within the class and one computer are required to run the case version).

Many teachers are beginning to see multimedia as one of the tools for learning about the world, and the tool is so powerful that along with it, new forms and methods of teaching and a new ideology of thinking appear in the education system. Television as a means of teaching, educating and developing students began to be used in general education schools at the end of the XXth century [7].

Let us look at the functions of the SMART Sync and SMART Response software, which we are actively starting to use in classes with students.

SMART Sync learning management software allows teachers to monitor and manage their students' computers while messaging, sharing files, and working together in a group. SMART Sync has a wireless connection support feature.

SMART Sync has the following characteristics:

– improved performance in wireless environments;

– Smart Sync optimization settings displays the student's Desktop on your screen with such quality and frame rate that allow you to maintain optimal network performance;

– advanced support for the teacher search function – each time SMART Sync Student is launched, the student can select the teacher they want to connect to from the drop-down list of teachers connected to SMART Sync Teacher;

– restoration after outages;

– SMART Notebook ™ SE support service, which includes the default app lock rule, which allows the teacher to block all apps on students' computers except SMART Notebook SE;

– improved search function and improved navigation, as well as features such as "selected" and "filter search results";

– a program to collect user feedback that will help us improve this software during the release of new versions.

– the language of the SMART Sync Teacher interface can be changed using the SMART language settings option;

– configure Smart Sync Student during installation.

The SMART Response system has the following functions:

– it is linked to the SMART Notebook system, so you can add images and other multimedia content to your questions and/or ratings;

– multiple assessment options, including quizzes and spontaneous questions, to assess students' understanding of the study material at any time during the lesson;

– teacher tools that allow you to create group lists and manage tests;

– variety of questions;

– teachers can ask different types of questions, including correct and incorrect ones, as well as a numeric fraction or mathematical expression;

– intuitive interface that contains clear and concise information for users of any experience;

– monitoring students during and after the test – ability to track how much time is left to complete the task;

– preview the results during the assessment;

– results are displayed in easily accessible pie charts or graphs that you can insert into your SMART Notebook page for a more detailed view;

– ability to add or change correct answers to completed tasks;

– multiple options for printing tasks as handouts;

– allows students to log in anonymously;

– integration in SMART Response with other file formats, including Microsoft Word, PowerPoint, PDF files;

– integrated rating log;

– tagging students to differentiate them, being able to mark keywords, etc. (SMART Response™ VE User's Guide) [6].

A modern teacher should not only have knowledge in the field of smart technologies, but also be a specialist in their application in their professional activities. Therefore, a necessary prerequisite for the development of smart education is the formation of professional personnel potential and the study of experience in improving the skills of teachers.

It should be noted that when implementing smart technologies in the teacher development system, the following principles should be taken into account:

– combination (smart technology should be combined with traditional technology, complement and enrich it);

– reasonableness (the choice of smart technology is determined for each specific educational event, taking into account its specifics, target audience, authorship, etc.);

– cost-effectiveness (smart technologies should save money, resources and time for all its participants);

– step-by-step (it is reasonable to implement smart technology in stages in the system of professional development of teachers, smoothly integrating it into the current process, gradually expanding the areas of application and regions);

– creativity (the choice of specific methods, techniques, and forms of presentation of material using smart technology requires a creative approach, the work of a team of like-minded people);

– communication skills (the possibility of direct communication, prompt presentation of information, remote monitoring of the process status, quick access to educational resources located on a remote server, as well as the possibility of online communication of remote users when performing a collective educational task);

– user productivity increases dramatically when automating non-creative, routine operations of searching for the necessary information and, accordingly, increases the effectiveness of educational activities [3].

Conclusions and prospects for further research of the direction

Therefore, the necessity of using smart technologies in professional activities is proved. It is important to teach students how to apply them correctly, introduce them to the maximum advantages of these learning tools and valuable information resources. Higher education teachers should clearly understand that smart technologies are a powerful and effective learning tool that allows them to introduce more diversified methods of attracting students to education. Further research directly requires studying the foreign experience of using smart technologies in the training of future specialists.

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