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Use of smart technologies in the training of specialists in higher education institutions

Використання smart-технологій у підготовці фахівців у ЗВО

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Abstract

Attention is focused on the importance of the use of smart technologies in the training of specialists in institutions of higher education. From the perspective of the educational system, smart society and smart education are presented, which are included in the content of a new type of education, in which the use of smart information technologies is mandatory. The main task of the educational space for smart education is written down - creating a basis for the possibility of realizing the intellectual and creative potential of education seekers. New opportunities for the education system created by smart technologies are described. The advantages of smart technologies and the features of their application in the educational process are listed. The main principles of smart education are highlighted and the components of smart education are listed. Online platforms, online services, portals, and applications, which are presented as smart technology tools within the scope of the study, were identified and divided into the groups of smart store, smart interaction, smart response, and smart trainer.

Анотація

Зосереджено увагу на важливості при підготовці фахівців у закладах вищої освіти застосування smart-технологій. З ракурсу освітньої системи подано smart-суспільство й smart-освіту, що входять до змісту освіти нового типу, в якому обов'язковим є використання інформаційних smart-технологій. Прописано основне завдання освітнього простору для smart-освіти – створення основи для можливості реалізації інтелектуального та творчого потенціалу здобувачів освіти. Описано нові можливості для системи освіти, які створюють smart-технології. Запропоновано чинники використання smart-технологій: збільшення передачі інформації та знань швидким темпом; динамічність адаптації здобувачів освіти й молодих фахівців до соціальних змін і оточуючого середовища; реформування системи навчання у відповідності до можливостей інформаційного оточення (збільшення продуктивності праці фахівців; гнучкість та прозорість освітньо-виховних процесів; освіта, що відповідає потребам та здібностям здобувачів освіти). Перераховано переваги smart-технологій та особливості їх

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Keywords: smart technology, smart society, smart education, specialist training, higher education institutions.

застосування в освітньо-виховному процесі. Для сфери освіти визначено технологічні основи, що розглядаються як старт: smart-проектори (розумні екрани); smart-дошки; програмне забезпечення, що сприяє створенню і здійсненню навчального контенту, який вміщує комунікативний і інтерактивний характер. Виокремлено основні принципи smart-освіти, перераховано складові smart-освіти. Визначено онлайн-платформи, онлайн-сервіси, портали і додатки, що у межах дослідження представлено як інструменти smart-технологій.

Ключові слова: розумні технології, розумне суспільство, розумна освіта, підготовка спеціалістів, вищі навчальні заклади.

Introduction

The world society makes modern demands on the new generation of education seekers, for which it is necessary: not only the creation but also the application of educational systems of a new format; changes in the educational process; updating methods, means, and forms of education. Therefore, it is necessary to introduce innovative technologies in education and realize opportunities in the educational process of professional training of future specialists in institutions of higher education. Not just the development, but the ultra-fast development of information and system technologies has offered profound transformations in all spheres of human activity. Therefore, today's information society is moving from an information society to a smart society, the main paradigm of which is the possibility of improving all spheres of an individual's life with the help of information technologies to ensure a new meaning of life (Rogulska & Tarasova, 2016).

In connection with the creation of a smart society, the very personality of the future teacher has changed, as well as his teaching methods, mechanisms for conducting classes, and technologies for forming the professional competence of a future competitive specialist.

The purpose of the article. To reveal the need to use smart technologies in training specialists in higher education institutions.

Literature Review

The use of smart technologies in the modern educational space has been actively studied not only in recent years but also remains quite relevant right now.

A. Kushnir (2020) highlighted the meaning of the following concepts: "smart society", "smart technologies", "smart education"; the author's interpretation of the distribution of smart technology tools by the following groups is offered: smart interaction, smart store, smart response, smart trainer; the advantages and disadvantages of using smart technologies in the educational process are analyzed.

S. Podlesny et al., (2019) set the goal of finding out the possibilities of innovative technologies, showing the advantages and features, the prospects of using smart technologies in the educational process of a higher education institution to qualitatively form the professional competencies of future specialists.

Yu. Lukyanova, V. Komar (2020) showed varieties of smart technologies, noted and proved that smart technologies are the beginning of a new educational paradigm. We described the possibilities of smart technologies for implementation in the educational process and developed a trend for the implementation of tasks for the formation of a modern creative personality in this educational process; proposed ways to use smart technologies in the learning process that encourage students to creative, cognitive activities.

Yu. Drachuk, L. Savyuk, Ye. Snitko (2019) singled out the stages of using smart technologies, revealed their priority direction in the educational process of higher education institutions. Scientists have defined criteria and indicators; the principles of effective use of smart technologies are described. The professional competencies of specialists acquired with the help of smart technologies are indicated, the

possibilities of using smart technologies in the educational process are shown.

O. Rogulska & O. Tarasova (2016) revealed the meaning of the software-technological educational complex based on the smart Board, which is the main component of smart technologies and is known as the "interactive whiteboard". It allows the creation of an information and communication environment with the help of traditional and innovative pedagogical learning technologies.

T. Lagutina (2014) described the necessary factors for the use of smart technologies: fast transfer of information and knowledge; dynamic adaptation of future specialists to the surrounding environment and social changes; reforming the educational system by the requirements of the information society.

A. Sydorenko (2019) shows the significance of the following technological smart tools for the field of education: smart projectors (smart screens); smart boards; software for the implementation of an educational process of an interactive and communicative nature; programs: Bridgit, Calameo, Prezi, PhotoPeach, Dipity, which allows you to qualitatively carry out the educational process and quickly conduct presentations for partners around the world, etc.

Methodology

Achieving the goal and solving the set tasks was facilitated by the use of a set of methods: theoretical - comparative analysis of Ukrainian and foreign works, theoretical analysis, synthesis, systematization and content analysis of philosophical, psychological and pedagogical works, concretization, typology, extrapolation – to reveal theoretical, methodological, and methodological the principles of using smart technologies in the training of specialists in higher education institutions, as well as the interpretation of the received empirical material; comparative-pedagogical analysis of research and classification – to clarify the essence of scientific definitions and the categorical-conceptual field of research; systematization and modeling; the selection of promising ideas and approaches that constitute the methodological and methodical basis for the generalization, design and correction of theoretical and methodological positions and experimental data - for the development of the educational and methodological use of smart technologies in the training of specialists in higher education institutions.

Results and Discussion

Smart education became possible through the creation of e-learning and the use of distance education, which started a new global phenomenon. This training is freely available, is carried out with the help of global content in the interactive space of education and is a new philosophy of education and a system of innovative technological solutions (Kuzminskyi et al., 2021). Smart education allows students to generate acquired knowledge, create the personality of a smart person who is fluent in information and computer technologies, can find and analyze information, applying innovations. "Smart" training makes the educational process effective thanks to the transfer of the educational process to the electronic environment. The considered approach allows to "copy" the teacher's knowledge and make it available to everyone (Rogulska & Tarasova, 2016).

In a smart society, it is necessary that for competitiveness in the labor market, a lifelong learner must constantly acquire and update universal, life-affirming, professional competencies. Smart education is a formative paradigm in education. The smart component is necessary to determine the properties of the process, the system acting in relationship with the environment, which necessarily responds to adaptation or changes in the educational process. Smart education is an educational system that is based on an innovative type of education, which has the goal of adaptive implementation of the educational process, in which the use of smart information technologies is mandatory. In this way, a virtual educational environment is created, in which the use of interactive means of information and communication technologies is mandatory, there is a constant update and replenishment of knowledge, which is checked as part of monitoring the quality of education. Smart education is aimed at interaction with the economic, social, and technological environment; the acquisition of knowledge, skills, and competencies based on pedagogical, technological, and organizational components. The decisive factor, the main source of the growth of the educational process is the use of smart technologies, which are a priority direction in the educational process under the conditions of globalization of the country's economic development. The key figure in this process is education, first of all, the education of mankind, the competence of the individual, the creative abilities of competitive specialists and the possibilities of their implementation. It is the education and high-quality professional training

of a specialist that becomes the primary source of a specialist's competitiveness and advantages in the 21st century (Drachuk et al., 2019).

A new quality of the society is a "smart society" (Smart Society) in which a combination of technical means, services and the Internet, when used by trained specialists, leads to changes in the interaction of subjects and allows showing and discovering new economic, social and other advantages for improvement life (Smart Technologies, 2022). In the smart society, a transition is being made from traditional education to smart education. And professional education, which is the main reference point for the competitiveness of a specialist in the global dimension, is becoming one of the globally updated fields both in its content and in the application of educational technologies and teaching methods (Rogulska & Tarasova, 2016). Having proved the importance of application and showing the need for the development of a smart society, we assert that it is:

- 1) the paradigm of the modern development of the universe, for which the Internet is a necessity and professionally trained people who create new scientific systems are an important lever of modern society, a smart society that represents not just the development of a model of the future, but an attempt to characterize and reveal its essence;
- 2) the quality of society, which offers a new approach to the educational environment and professional activity, where the combination of technical means, services and the Internet, their use by professionally trained people leads to qualitative changes in the interaction of people and makes it possible to obtain progressive effects - economic, social and other advantages, which lead to a better life (Biletska et al., 2021).

An important quality of a smart society is such technologies, the basis of which was previously based on information and knowledge, and now it is being transformed into technologies based on the exchange of experience and interaction. Smart technologies give things and phenomena a new essence, starting a "smart" object based on innovative changes in its essence. People in a smart society are specialists who think creatively and flexibly, their thinking is open, creative, they work and think in new ways; have the ability to quickly and effectively find a result, competently apply knowledge, operate with information and

have an information culture (Kuzminskyi et al., 2018).

An information smart society is formed from various levels of educational institutions, enterprises, organizations, authorities and civil society institutes. The key basis of Smart-education is the introduction of an adaptive approach, which includes people's motivations for change and the mentality of the country's citizens (Shchyrbul et al., 2022).

The situation developing in the world raises the following questions:

- How to motivate staff?
- How to preserve intellectual property for the country?

The transition to smart education involves the answers to these questions: the wide implementation of international standards, the growth of electronic mass media, the opening of the content of educational institutions, the emergence of vertical and horizontal competencies, the use of electronic textbooks, educational platforms, the possibility of realizing the competitive potential inherent in scientists, teachers, students, specialists, increased attention to innovative resources (Podlesny et al., 2019).

The basis of the space for smart education is the development of conditions for the implementation of a creative approach and the increase of the intellectual potential of education seekers. Smart technologies are integration methods for the quality education of future competitive specialists who pass through the advanced aspects of information and educational technologies available in the world.

Let's list the new opportunities that the use of smart technologies creates for the educational system:

- integration of educational institutions into the international educational space;
- coverage of additional categories of students, foreign students;
- application of new educational technologies and innovative means in education;
- creation of new guidelines for education, education seekers, teachers, monitoring activities;
- strengthening the role of scientific research;
- introduction of new, innovative and effective models of management and administration (Kuchai et al., 2022).

Let's consider the requirements proposed for educational resources within smart education:

- openness. Open Educational Resources was launched in 1998 by UNESCO. Further development can be seen in the EU Memorandum on Lifelong Education in 2000 and the Cape Town Declaration "Open Education - the Future of Education" in 2001;
- modules containing structured educational resources, i.e. knowledge necessary for the modern development of society, elements of activity for the formation of necessary competencies in a certain direction of training;
- self-sufficiency in the module for the formation and improvement of professional competencies of future specialists, interactive learning of knowledge;
- subject orientation of the module on the development of the individuality of the student's personality for successful educational activities;
- meta description of the module, for automated search in repositories;
- availability of an intelligent authorized module search system based on its meta description;
- the possibility of using the module autonomously in any sequence, taking into account the use of individual elements, their transformation to form the personal trajectory of the student of education.

For high-quality mastering of the methods and techniques of smart technologies, interactive training of students in the field of smart education and updating the qualifications of higher education teachers through the creation of new methodological support for educational courses for the effective application of smart technologies is mandatory (Lukyanova & Komar, 2020).

Let's note the mobility, accessibility, ease of use, cheap introduction of smart technologies in education, which are becoming common means of education, influencing education from a methodical and didactic point of view. The teacher needs to possess a range of not only skills but also skills that offer confidence and adequate use of these technologies, the application of the teacher's organizational skills. All this leads to the necessary improvement of successful practices, the application of new competitive models of training specialists and innovative training methods:

- a group of methods of organizing and implementing the educational process: educational discussions, analysis of video situations, research method, method of independent activity and creativity - implemented with the help of such smart technology tools as blogs, smart textbooks, programs for conducting webinars, YouTube, Facebook, WiseMapping, LinguaLab, Kahoot, Lyricstraining, Twitter, Instagram, Word it out.
- a group of methods of motivation, stimulation of the educational process: storytelling and role-playing games, gamification - their implementation is possible with the help of YouTube, Lyricstraining, Learning Apps, Quizlet, Kahoot, Facebook, Twitter, Instagram.
- a group of methods of control, monitoring, self-monitoring for the effectiveness of educational activities (this group also includes the project method) – we offer smart technology tools, such as Learning Apps, Thinglink Kahoot for their implementation (Kushnir, 2020).

The use of smart technologies is determined by several factors. Let's list them:

1. increasing the transfer of information and increasing the speed of knowledge;
2. dynamic adaptation of education seekers and specialists to social changes in the surrounding environment;
3. the need to update the educational system to the capabilities and requirements of the information society (flexibility and transparency of education; increasing labor productivity; the educational process by the abilities and needs of education seekers) (Kiryakova et al., 2018).

We will reveal the advantages of using smart technologies in the educational process:

- the possibility of using smart technologies during the teaching of professional disciplines;
- effective assimilation of knowledge;
- increasing interest in education among students;
- modernization of the educational space with technologies and their perception and understanding by the students of education.

With the help of Smart technologies, it is easier for the teacher to collect material, present the material in an accessible form, make it interesting, quickly monitor the quality of

students' knowledge, increase interest in the educational process, and reveal the creative abilities of each student of education (Lagutina, 2014).

Smart education provides an opportunity to use all the advantages of the global information society to improve educational needs and increase the interests of those seeking education (Dake & Ofosu, 2019).

Smart education is a concept that enables the modernization of the comprehensive implementation of all educational processes, methods, and technologies that are present in these processes.

We emphasize the flexibility of the concept of smart education, which provides:

- availability of an unlimited number of sources;
- maximum multimedia diversity;
- quick and easy adjustment according to the level and needs of the students of education (Sydorenko, 2019).

Let's consider the main component of smart technologies, which is a software-technological educational complex based on SMART Board, which we know as an "interactive whiteboard".

The program and the technological educational complex include:

- touch-sensitive smart Board screen,
- Software,
- Personal Computer,
- multimedia projector,
- communication equipment.

The software-technological educational complex makes it possible to create an information and communication environment for the use of traditional and innovative technologies in the educational process. To work with the screen, it is enough to be a computer user. Interactive methods are built based on DVIT technology, which provides the opportunity for several users, independently of each other, to work on the board at the same time. Thanks to such innovativeness of the device, teachers use possible program resources and themselves create interesting development of various types of vocational tasks for individual or group forms of work, which have different levels of complexity for students of the appropriate level of training (Omonayajo et al., 2022).

The smart Board complex has application programs and settings: a program for conducting instant conferences, a recording program, etc., as well as an application program for ensuring collaboration with other Microsoft Office applications (Microsoft Office such as MS Word, MS PowerPoint, MS Excel). For students to create compositions from graphic and textual fragments, store materials, reproduce them during the demonstration, there is a smart Notebook application, which is the basis of the smart Board software complex. Learners of foreign languages use smart Notebook for various tasks: compose and act out dialogues, form sentences, connect their parts, finish sentences, place them in the correct order, highlight the main points in the text, play games, combine words with their meaning, determine parts of speech. Learning becomes easy, interesting, and relaxed. With this approach, the dynamism of the educational process, the desire to understand, learn, possess, and use innovative information increases (Rogulska & Tarasova, 2016).

Let's highlight the main principles of smart education:

- use of current information of the educational program when solving educational problems;
- independent, research, cognitive, and project activities of education seekers;
- implementation of the educational process in the distributed innovative educational space;
- interaction of education seekers with the professional community;
- individualization of education;
- flexibility of the educational trajectory;
- multifaceted activities in the educational space (Luo, 2022).

For the training of specialists, we will distinguish the following components of smart education:

- update of educational programs, use of information with the help of process innovation;
- project education;
- interactive forms of education (workshop, web quest, training, etc.);
- use of electronic notes of lectures;
- use of methodical recommendations for independent work of education seekers;
- distance education;
- practical education in a professional environment;

- an example of the activities of successful specialists in the information sphere;
- joint work of education seekers and teachers on projects during scientific research work;
- joint work of students and teachers in social networks (Telegram, WhatsApp, "Media Business" group on Facebook, groups on Instagram);
- formation of innovative, analytical competencies; problem-solving skills in a complex manner, the use of intercultural communication, etc. (Kuchai et al., 2021).

Therefore, smart education is a formative paradigm in the educational environment, constitutes an educational system laid as a basis for the education of a new generation, which provides for the adaptive implementation of education, where smart information technologies are used (Sydorenko, 2019).

Within the scope of the study, online services, online platforms, portals and applications were defined as tools of smart technologies, which are divided into groups of the smart store, smart response, smart trainer, and smart interaction.

Smart technology tools are used when introducing new material or checking learned topics to improve the skills of students.

Using the tools of smart technologies in education, students become active participants in the educational environment, cognitive interest is manifested through an active relationship to the subject of knowledge, that is, to smart technologies.

We justify the division of smart technology tools into groups (Diaz-Parra et al., 2022):

- smart response group. Smart technologies are included, which are necessary for creating and conducting testing or surveys using personal devices (Kahoot, Plickers). Smart stores use components that can be useful for hosting educational content that changes and is filled by users independently (YouTube, Smart textbook, blogs).
- smart interaction group. It can be used to create a communicative space and ensure relationships between teachers and students (Instagram, Facebook, programs for conducting webinars, Twitter).
- a group of smart trainers. Smart technologies are used, which independently create an interactive task, offer a wide range of created exercises that directly affect the training and improvement of language and speech skills

(Word It Out, Learning Apps, WiseMapping, Thinglink, LinguaLab, Quizlet, Lyricstraining) (Kushnir, 2020).

The new global task that Smart-society sets for higher education institutions is: training personnel with creative potential, i.e. thinking individuals who can work in the new world. For this purpose, it is mandatory to learn new skills of a practical nature: changing the nature of the educational process, communicating in social networks, working with electronic sources, compiling personal knowledge bases, and selecting useful information (Shunkov et al., 2022).

Smart e-learning is used for personalization and adaptation of training; flexible education in an interactive environment; free access to content at the global level.

Smart learning is used when using the Internet, technological innovations that allow students to acquire professional competencies based on a multidimensional system vision, studying the material taking into account their multifacetedness, and continuity of updating the content (Morze et al., 2017). Smart education should be a mandatory component in the life of an education seeker, be based on innovative technologies, and have an informal nature. To be in the context of new changes and growing demands of education seekers in institutions of higher education, it is necessary to meet the following requirements: innovation, flexibility, quality indicators, and adaptability (Kotiashev et al., 2022).

So, smart technologies in education, which are gaining more and more importance in the world, allow to optimize of the costs of educational institutions for material and technical support and bring the quality of education services and learning products to a new level; are used to implement educational programs, which include not only instrumental technologies for conducting the educational process but also innovative curricula and disciplines; allow to develop innovative teaching and methodical materials, to form individual trajectories of educational activities for education seekers (Podlesny et al., 2019).

Conclusions

Smart education is represented by an educational system, which is a mandatory component in a new type of education, which has an adaptive

implementation of the educational process, in which smart information technologies are used.

The justification of the smart society is presented as a new paradigm of the development of society, for which the necessary components are the Internet and trained specialists who provide new knowledge because the smart society represents a new quality of society in which the use of technical means, services, and the Internet leads to interactive changes in the relations of subjects. The main task of the space for smart education is written out. Factors for the use of smart technologies are proposed. The advantages of using smart technologies in the educational process are indicated.

The necessary technological tools for the field of education, which are considered as a start, have been determined; software for creating and implementing educational content; various programs.

For quality training of competitive specialists, the main principles of smart education and the components of smart education are highlighted.

Within the scope of the study, online services, online platforms, portals and applications were defined as tools of smart technologies and divided into groups of smart response, smart store, smart interaction and smart trainer.

Further research will be aimed at training personnel with creative potential who will be able to work in the new world.

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