DISTANCE LEARNING TECHNOLOGIES IN THE VIRTUAL EDUCATIONAL SPACE OF A MODERN UNIVERSITY

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The modern educational environment is increasingly acquiring innovative features of a virtual space. The education system properties, communication style, attitude to motivation, the teacher's and students' roles are changing. Computer-assisted technologies modify the form and format we receive information, communicate with other people or devices, documentation management. Learning, communication and assessment are the foundations of any educational system. Nowadays, modern computer-assisted technologies support the development of a global pedagogical system as a virtual educational environment.

In this paper, we tried to review the main issues of the distance learning system implementation in the virtual educational space of universities for improving the quality of professional training. The successful integration of distance learning in the system of university education demands some special requirements, which help to adjust the distance education compatible with the existing forms of education. The distance learning is regarded as an interaction between students and teachers and the main preconditions for facilitating computer-assisted distance technologies at the higher professional institutions are listed.

The paper draws attention to the main education tools used by the university in pandemic times as the crucial resources for online teaching, analyses their effectiveness and further suitability for conducting professional distance training, including online and offline tasks, independent students' activities, students' evaluation and self-evaluation, intermediate and final testing as well as official results documentation in the special system Electronic Campus (e-Campus) created by the university.

The main technical, organizational and psychological problems preventing distance education development have been analyzed and some solutions based on a sociological study conducted among different categories of students have been suggested.

It has been stressed that the effectiveness of distance education at universities cannot be assessed unequivocally. It is undergoing rapid development and has many benefits over traditional methods of teaching. The modern demands for lifelong professional education require the training of specialists ready for constant development and the universities should be able to contribute to this process by creating a compatible virtual education environment.

ТЕХНОЛОГІЇ ДИСТАНЦІЙНОГО НАВЧАННЯ
У ВІРТУАЛЬНОМУ ОСВІТНОМУ ПРОСТОРІ СУЧАСНОГО УНІВЕРСИТЕТУ

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Ключові слова: *дистанційна освіта, технології дистанційного навчання, е-Сampus, технології навчання, професійна освіта, професійна підготовка, види дистанційної освіти, університет, віртуальний освітній простір.*

Сучасне освітнє середовище дедалі більше набуває інноваційних рис віртуального простору. Видозмінюються властивості системи освіти, стиль спілкування, ставлення до мотивації, ролі викладача та студентів. Комп'ютерні технології змінюють форму та формат отримання інформації, комунікації з людьми чи розумними пристроями, управління звітною документацією. Навчання, комунікація та оцінювання є основними складовими частинами будь-якої освітньої системи, які в наш час підтримуються в межах розвитку глобального навчального середовища як віртуального освітнього простору за допомогою сучасних комп'ютерних технологій.

У статті розглядаються основні питання впровадження системи дистанційного навчання у віртуальному освітньому просторі університетів для підвищення якості професійної підготовки. Успішна інтеграція дистанційного навчання у систему університетської освіти вимагає дотримання певних критеріїв, покликаних допомогти адаптувати дистанційну освіту з наявними традиційними формами навчання. Дистанційне навчання розглядається в роботі як взаємодія між викладачем та студентами і перелічуються основні передумови, покликані сприяти успішному впровадженню дистанційних технологій у вищих навчальних професійних закладах.

Стаття аналізує застосування основних освітніх ресурсів, які використовуються університетами у час пандемії для онлайн-навчання, розглядаються їх ефективність та придатність для проведення професійного дистанційного навчання, зокрема організації онлайн- та офлайн-занять, самостійного навчання студентів, оцінювання та самооцінювання отриманих результатів, проміжного та підсумкового тестування, оформлення офіційної підсумкової документації у спеціальній системі Electronic Campus (e-Campus), створеної університетом.

Проаналізовано основні технічні, організаційні та психологічні проблеми, що перешкоджають розвитку дистанційної освіти на сучасному етапі, та запропоновано низку рішень на основі соціологічного дослідження, проведеного серед різних категорій студентів.

Підкреслено неоднозначність ставлення щодо ефективності дистанційної освіти в університетах, яка впроваджується швидкими темпами і має багато переваг перед традиційними методами навчання. Сучасні вимоги до професійної освіти протягом усього життя вимагають підготовки фахівців, готових до постійного розвитку, і університети повинні внести свій вклад у цей процес, створивши сучасне віртуальне освітнє середовище.

Introduction. Computer technologies have inevitably become a part of our life. Modern education is closely connected with the Internet and distance learning has been implemented all over the world for active learning and interaction between students and teachers. Recently, in pandemic conditions, the development of distance education technologies has accelerated due to the necessity of carrying out studies in the traditional way in conventional premises. Therefore, it influences the rapid development of long existed but undervalued forms of distance learning as alternatives, which came to rescue.

The development of computer technologies is one of the main reasons for the changes in the modern educational concept, which combines pedagogical and computer-assisted technologies as one whole. Distance learning takes a significant place in this concept, as a means of holistic, professional and personal development. Under the pressure of the current pandemic situation, traditional universities are forced to expand the implementation of computer-assisted learning and take steps towards increasing the share of lifelong education.

Problem statement. Sociological studies conducted at the beginning of our century showed that over 80% of teachers were not familiar with distance learning technologies [1]. Certainly, the situation has changed rapidly during the last decades but there is still a great contradiction between the creation of a distance education system and the computer skills level of the pedagogical staff. One more problem is the quality of existing distance courses that in most cases are textbooks in electronic format. Distance learning is often regarded only as students' independent work with computer control.

A range of scientists and methodologists (J. Beese, M. Moore, B. Holmberg, T. Anderson, J. Xiao and others) admit that modern pedagogy often lags behind existing realities and cannot formulate the basic concepts and adequate educational policy towards the fundamental changes in education and present situation with distance learning technologies abrupt implementation in particular [2–6].

Distance learning is regarded in this paper as a student(s)-teacher interaction at a distance, which includes all main components of the traditional educational process (aims, content, methods, types of organization, teaching aids etc.) implemented through interactive Internet technologies. This type of interaction between the subjects of the educational process aims at the student's independence, and successful knowledge acquisition [2; 3].

The place and role of distance education at modern universities raise a question of further development of professional training and changes necessary to be taken in the traditional education system.

Purpose of the article. The purpose of the paper is to consider the implementation of the distance learning system in virtual educational space of modern universities for the benefits of professional training improvement and modernization.

Presentation of the main material. The Regulation of the distance education, adopted by the Ministry of science and education of Ukraine on September 8, 2020, defines the distance education as an organization of the educational process as an indirect interaction in the educational environment based on modern educational, informational and communication (digital) technologies providing a complex of educational services to any individual in the country and abroad employing specialized information and the educational environment from an educational institution [7].

For the successful development of distance learning at universities, computer technologies should be integrated into the university educational process. Furthermore, a special students' and teachers' virtual information space is needed to be created, where the learners can obtain information about the course, the teacher, the assessment criteria, the library resources, and other facilities; as well as the teacher's information space supports working in computer-assisted environments, getting access to different course materials and methodological instructions, sharing experience, and protecting intellectual property.

In the process of implementation of the distance education system at the higher professional institutions, a number of primary tasks should be solved. First of all, a thorough study of the regulatory framework of distance education is vital. The technical conditions analysis is also needed taking into account the existing equipment per students. Special training facilities for the distance higher education organization should be created. The organization of educational process and reliable evaluation are important. Timely technical support for students and teachers must be provided.

The university should also provide a sufficient database for distance learning, including a range of basic educational, professional and methodical

literature, periodicals, reference and bibliographic, collection of scientific literature and publications suitable for each educational program. It is also important to develop various digital educational resources such as specialized textbooks, digital educational materials, teaching aids, training programs, computer laboratory workshops, sets of testing materials, educational films, audio recordings and other.

The university staff should be prepared for teaching in a new educational environment and carry out direct interaction with students, regardless of their location and distribution in time. They also should know how to employ distance educational technologies in teaching future professionals in different areas. Their work is only effective when results in the direct successful management of the students' work, distance lessons provision for various educational groups, high-quality control and intermediate certification. The teachers should be able to give technical advice to students and participate in the development of course materials.

The current practical experience has prioritized the organization of distance learning. Only a combination of traditional educational methods and the recent achievements in the distance learning technologies is the basis for the successful implementation of high-quality professional training in the modern university.

The recent introduction of total distance learning forced the university teachers to determine experimentally the most suitable tools for its implementation. For video conferencing the teachers mostly used Zoom, Skype, Google Meet platforms; for providing learning materials and tests – Moodle, Google Classroom, Classtime platforms and messengers Telegram, Viber, Discord etc., and for official monitoring and assessment – specially developed university system Electronic Campus (e-Campus).

The Moodle and Google Classroom platforms are widely used in higher educational institutions as they are free with simple and intuitive interfaces, reliable, adapted for various devices with different operating systems, translated into more than a hundred languages, and used by many universities in the world. These electronic educational platforms make it possible to design and structure the educational courses at the discretion of the educational institution [8].

These platforms are suitable for planning and organizing learning material in special electronic rooms easily accessed by students and could be adjusted accordingly the educational requirements of different subjects. All types of tasks could be automatically or manually evaluated from 5-point to 100-point scales, the learning material including texts of different types and formats, audio and video

files is set in advance before the start of the lesson. The lessons structure, as a rule, comprises the topic name and date, warming up or welcoming sentences, lesson summary, instructions and explanations, students' assignment to complete as a follow-up, and the teacher's feedback. Any files with texts and presentation could be attached. The students in their turn have to do tasks according to the received instructions and attach the completed work to the appropriate lesson before the deadline set by the teacher.

For the assessment, the teachers can easily make an appropriate test and check the results in automatic or manual mode depending on the settings. The teachers can also indicate in what form the students should send their answers. Grades are given instantly or within 24 hours after the students have provided the answer and contain a comment when the teacher finds it necessary. Some platforms permit the teacher to monitor how the students are completing the test in real-time and make comment if necessary. Then teachers can transfer the grades to the official university e-Campus, which takes a lot of time and efforts and has to be done manually as this system is not compatible with other education platforms yet.

The current stage of the distance education technologies development at universities is characterized by the abilities to conduct traditional lessons of various types in online interactive mode supplemented by multimedia means in the forms of Internet videoconferences with simultaneous transmission of video, sound, slide, graphic information from teacher to student and vice versa. This creates an effect of face-to-face training and permits to achieve results in distance learning similar to face-to-face interaction. Distance learning technologies give such interesting opportunities for educational material delivering as downloading educational resources from a virtual classroom, structuring and linking course sections, communication with teachers and students via e-mail, different platforms and messengers, updating the training course materials in real-time, etc.

However, for successful interaction in a computer-supported environment, a student and a teacher must possess a range of skills, which change traditional ideas about the organization of educational activities. It should be noted, that the successful implementation of distance learning technologies might prevent technical incompetence, organizational difficulties with planning, implementation and supporting of distance learning technologies in different areas of training, a lack of a unified coordinated strategy in the information technologies introduction and employment, insufficient funding of the real costs of working time in distance learning projects developed by the educational institutions, a lack or absence of

copyright protection policy for created electronic educational resources.

As part of the authors' sociological study of a level of teacher-student interaction in the distance learning process (March–May 2020), conducted to identify the respondents' attitude to the various types of distance learning, and to establish the most beneficial methods of online education for different categories of students some interesting data was received for further analysis and consideration. The interviews were carried out in the 21 groups of students ranging from the first year bachelors to the fifth year masters. The analysis of their responses demonstrated the following difficulties they face the distance educational process in the university:

– the lacks of a unified strategy from the university in the distance learning process organization, lessons provision and electronic materials issuing, which was often poorly correlated with curricula and training programs;

– the intensity, complexity and laboriousness of the educational process have significantly increased with the distance learning implementation due to the need for daily viewing of information on different online resources, asking numerous questions and online consultations with teachers and other students.

As a result, the reorganization of traditional forms of teaching was irritating for many students. All the mentioned difficulties resulted in the students' lack of decent motivation and incentives. The increasing intensity and complexity of the different subjects training in the distance mode required from them some time for adjustment, as well as a development of self-organization techniques and the close interaction with teacher and administrators. The greatest difficulties the students had with the exact disciplines in the forms of interactive consultations without regular and timely support from their teachers. The inability to demonstrate answers in the form of mathematical formulas and functions, matrices, pictures, diagrams significantly reduced the effectiveness of studying.

The sudden transfer to of distance learning mode at universities also demonstrated the necessity of improving the computer skills of the teaching staff and the implementation of relevant training programs, consultation and round-the-clock support, which should become one of the main directions of the virtual educational space of modern universities development.

Conclusions. Thus, the sudden transition to universal distance learning, in the current situation, demonstrated a range of problems at university professional training organization. Communication systems and computer technologies are not fully integrated into the university educational process and the range of created distance courses and their materials proved to be insufficient. Teachers have to be urgently trained on to use new platforms often without proper technical support. Most students felt a huge studying overload and a lack of full-time active communication with the teachers and groupmates, which caused problems with psychological adaptation and anxiety increase.

Modern universities require a significant transformation of the traditional system of education and develop a wide range of virtual educational environment for implementing the positive potential of distance learning, which permits to modernize the professional training and increase the educational level, provide new opportunities for certification, ensure the accumulation and transfer of knowledge and experience between the educational institutions, and contribute to the development of the computer-assisted lifelong learning.

It is necessary to continue studying the pedagogical and psychological aspects of the total implementation of distance learning at universities and the influence on professional training.

BIBLIOGRAPHY

1. Товажнянский Л., Кравец В., Кухаренко В. Развитие дистанционного образования в университете. *Образовательные технологии и общество.* 2003. № 6(1). С. 181–186.
2. Beese J. Expanding learning opportunities for high school students with distance learning. *American Journal of Distance Education.* 2014. No. 28(4). P. 292–306. DOI: https://doi.org/10.1080/08923647.2014.959343 (Last accessed: 13.01.2021).
3. Moore M.G. Handbook of Distance Education. Second Edition. Routledge, 2013. 752 p. URL: https://doi.org/10.4324/9780203803738 (Last accessed: 13.01.2020).
4. Holmberg B. Guided didactic conversation in distance education / in D. Sewart & B. Holmberg (eds.), Distance Education: International Perspectives. London : Croom Helm. 1983.
5. Anderson T., Dron J. Three generations of distance education pedagogy. *The International Review of Research in Open and Distributed Learning.* 2011. No. 12(3). P. 80–97. DOI: https://doi.org/10.19173/irrodl.v12i3.890 (Last accessed: 13.01.2021).
6. Xiao J. On the margins or at the center? Distance education in higher education. *Distance Education.* 2018. P. 259–274. URL: https://doi.org/10.1080/01587919.2018.1429213 (Last accessed: 13.01.2021).
7. Про затвердження Положення про дистанційне навчання : Наказ Міністерства освіти і науки в Україні від 25.04.2013 р. № 466 : станом на 16 жовт. 2020 р. URL: https://zakon.rada.gov.ua/laws/show/z0703-13#Text (Last accessed: 13.01.2021).

8. Saienko N., Chugai O. Creating ESP classroom culture based on student-generated ideas. *ScienceRise: Pedagogical Education.* 2020. P. 31–34. DOI: https://doi.org/10.15587/2519-4984.2020.202013 (Last accessed: 13.01.2021).

REFERENCES

1. Tovazhnyanskyj, L., Kravec, V., Kuharenko, V. (2003). Razvytye dystancyonnoho obrazovanyya v unyversytete [Development of distance education at the university]. Educational Technology & Society, 181–186 [in Russian].
2. Beese, J. (2014). Expanding learning opportunities for high school students with distance learning. American Journal of Distance Education, 28(4), 292–306. DOI: https://doi.org/10.1080/08923647.2014.959343.
3. Moore, M.G. (Ed.). (2013). Handbook of Distance Education: Second Edition. Routledge. Retrieved from: https://doi.org/10.4324/9780203803738.
4. Holmberg, B. (1983). Guided didactic conversation in distance education. / In D. Sewart, D. Keegan, and B. Holmberg (Eds.), Distance education: International perspectives (pp. 114–122). London : Croom Helm.
5. Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy. The International Review of Research in Open and Distributed Learning, 12(3), 80–97. DOI: https://doi.org/10.19173/irrodl.v12i3.890.
6. Xiao, J. (2018). On the margins or at the center? Distance education in higher education. Distance Education, 259–274. DOI: https://doi.org/10.1080/01587919.2018.1429213.
7. Pro zatverdzhennya Polozhennia pro dystantsiine navchannia (2020) [On approval of Distance learning regulations]. URL: https://zakon.rada.gov.ua/laws/show/z0703-13#Text [in Ukrainian].
8. Saienko, N. & Chugai, O. (2020). Creating ESP classroom culture based on student-generated ideas. ScienceRise: Pedagogical Education. 31–34. DOI: https://doi.org/10.15587/2519-4984.2020.202013.