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Use of Digital Technologies in Higher Education Institutions in the Context of Social Challenges

Wykorzystanie technologii cyfrowych w instytucjach szkolnictwa wyższego
w kontekście wyzwań społecznych

ABSTRACT

The article highlights the ways of the use of digital technologies in the higher education system of Ukraine in the professional training of future teachers in the context of modern social challenges. The importance of digital resources in the organization of distance and blended learning under martial law is substantiated. It is emphasized that the informatization of society and the activities of educational institutions significantly affects the formation of content, organizational forms, teaching and management methods. It is emphasized that the digital culture of a teacher implies a high level of digital competencies, i.e. the ability to work with modern digital technology and master modern information and communication technologies. The article presents the results of an experimental study on "Use of digital technologies in the educational process of a higher education institution" conducted at the Vasyl Stefanyk Precarpathian National University. It was conducted with the aim of identifying

the level of students' awareness of the possibilities of using modern digital tools in the course of bachelor's education, substantiating and developing methods for using digital resources in the process of distance and blended learning, promoting the formation of digital competence of future teachers and improving the preparation of students for professional activities. It is emphasized that the experimental study made it possible to identify and specify the didactic and practical prospects for the use of digital technologies in the process of students' professional development. It is concluded that in the process of digitalizing the professional training of future teachers, special attention should be paid to the creation of interactive educational environments, the use of digital methods and innovative pedagogical teaching technologies, the formation of digital competence of students, as well as the development of networking between participants in the educational process in the context of global challenges.

INTRODUCTION

In today's world, digital technologies have become an integral part of the educational process, particularly in higher education. The rapid development of technology, access to the Internet, and the proliferation of mobile devices have created new opportunities for learning, communication, and knowledge sharing. However, new challenges are also emerging that require the educational system to adapt to the conditions of modern society.

Social challenges, such as the Russian-Ukrainian war, the COVID-19 pandemic, political instability, economic crises, and social changes, are forcing higher education institutions to look for new approaches to organizing the educational process. The use of digital technologies is becoming a key factor in ensuring the continuity of the educational process, flexibility of curricula, and improving the quality of education.

Modern higher education in Ukraine is in a state of intense change caused by two fundamentally important trends. The first of them is in line with the general civilizational development, which involves the introduction of digital technologies in all spheres of life; the second is due to martial law, which often makes traditional educational processes impossible. Thus, the educational process of higher education is facing the need for qualitative adaptation. It is about the need to change the nature of the presentation of educational material, which would occur while preserving its general content. The foundation of such a transformation is naturally information and communication technologies, which allow not only not to lose anything from the educational material, but also to enrich and improve the educational process.

ANALYSIS OF RECENT PUBLICATIONS AND RESEARCH

Recently the use of digital technologies in higher education institutions has been the subject of numerous studies and scientific publications. Researchers from around the world are investigating the impact of digitalization on the learning

process, the effectiveness of various digital tools and platforms, and the challenges faced by teachers and students in the face of constant social change.

In recent decades the issue of improving the professional training of future teachers, in particular for educational institutions of the Carpathian region, has attracted the attention of such scholars as G. Bilavych, M. Chepil, I. Chervinska, O. Dzhus, O. Karpenko, O. Kilichenko, O. Kondur, V. Lappo, N. Lysenko, P. Losiuk, N. Lutsan, H. Mykhailyshyn, M. Oliyar, L. Prokopiv, B. Savchuk, V. Stynska, O. Tsiuniak, and others.

The problems of using information technology in the context of forming the digital competence of future teachers, developing STEAM education in the context of digitalization, adapting students to the social challenges of distance and blended learning in higher education were considered by O. Budnyk, T. Blyzniuk, O. Dudka, M. Fedorchenko, I. Honcharova, M. Kotyk, I. Iliichuk, E. Marynchenko, O. Maslova, M. Pryhodii, O. Vorobets, O. Vlasii, O. Yudenkova, and others.

Despite the considerable interest and attention of scientists and methodologists to the problems of digitalization of the educational space of higher education institutions, the use of digital tools in the process of professional development of young people, a targeted system of training teachers for the safe and effective use of digital technologies has not yet been fully developed in our country. Studies on the development of teachers' and students' digital competence emphasize the lack of mechanisms for effective self-regulation of the information market and note that imperfect protection of students from digital content can harm their mental, physical, and social health.

When interpreting the concept of "digital technology" we take into account the definition given in the *Information and Communication Technologies in Education* dictionary (2019), compiled by scientists from the Institute of Information Technologies and Learning Tools of the National Academy of Pedagogical Sciences of Ukraine: "Digital technology is any product that can be used to create, view, distribute, modify, store, select, transmit, and receive information by electronic means in digital form". Examples of such technologies include personal computers and devices (computer, laptop, netbook, tablet, smartphones, mobile communication devices, game consoles, media players, e-book readers), digital television, robots, etc. (*Informatsiino-komunikatsiini tekhnolohii…*, 2019, p. 110).

Marynchenko and Fedorchenko (2024) emphasize that the informatization of society and educational institutions not only encourages the creation of new digital learning technologies but also significantly affects the formation of content, organizational forms, teaching methods and management. This process also leads to dramatic changes in the activities of students and teachers, opening up new opportunities for effective learning and development in the modern digital environment. Scientists argue that the use of digital technologies in the training of future vocational teachers can be realized through the following areas: testing

of electronic learning tools, work with text-based learning tools, development of electronic support for training sessions, use of technology in extracurricular activities (Marynchenko, Fedorchenko, 2024, pp. 594–595).

We agree with the opinion of Maslova et al. (2023) that the digitalization of the education system consists in the technological and digital modernization of the infrastructure of the educational institution, the creation of a safe digital educational environment, the development of digital competence of pedagogical, scientific, pedagogical and administrative staff who are able to effectively use digital technologies in the educational process (p. 306).

The digital culture of a teacher implies the ability to work with modern digital technology and to master modern information and communication technologies. In this context Blyzniuk (2021) emphasizes that a modern teacher must have the so-called ICT competence, in particular, possess such ICT skills as computer literacy, information literacy (information culture), multimedia literacy, and computer communication literacy (p. 147).

It is worth noting that the New Ukrainian School (NUS) Concept, approved by the Ministry of Education and Science of Ukraine (*Kontseptsiia "Nova ukrainska shkola"…*, 2016), emphasizes the importance of using information and communication technologies as a necessary component of digital education in teaching subjects and managing educational institutions. Among the ten key competencies of the NUS, one of the leading places belongs to ICT competencies:

Information and digital competence involves the confident and at the same time critical use of ICT to create, search, process, and exchange information at work, in public space, and in private communication. Information and media literacy, programming basics, algorithmic thinking, database management, Internet and cybersecurity skills. Understanding the ethics of working with information (copyright, intellectual property, etc.). (*ibid.*)

We agree with the conclusions of many scientists that the use of the latest technologies in the educational process has many advantages: the time spent by the teacher and the student on mastering a new topic is reduced; the quality of education is improved; the efficiency of the teacher's work is increased; the cost of education can be reduced without reducing its quality; technologies force students to be active in all areas (Hurevych et al., 2021).

Budnyk and Nikolaiesku (2022) consider the digital skills of a teacher of the 21st century to be: the use of technical means, digital tools and resources for the development of critical thinking, creativity; establishing communication, organizing the learning activities of students; using software for data visualization; using digital educational resources for the exchange and dissemination of educational information; using ICT to create educational content; organizing distance learning, instant feedback through digital technologies.

We share the opinion of Pryhodii (2024) who defines the digital competence of a teacher as the ability to successfully use a set of technologies and methods of digital learning in the information and educational environment of an educational institution in accordance with the requirements of digitalization of education and the industry specifics of professional training. Pryhodii (2024) classified digital technologies according to the following criteria: hardware, software, communication software, by the method of application in professional training (pp. 4–5).

It should be emphasized that in the process of digitalization of professional training of higher education students, special attention is paid to the creation of interactive educational environments, the use of digital methods and pedagogical technologies, the formation of digital competence of students, as well as the development of networking between participants in the educational process. In this context, we emphasize the importance of systematic study of software and communication support for the use of digital technologies in the educational process of a modern higher education institution.

Thus, the analysis of recent publications shows a wide range of research on the use of digital technologies in higher education institutions. They highlight both the advantages and challenges that arise in the process of digitalization of education and offer various approaches to solving current problems.

ANALYSIS OF EMPIRICAL STUDIES

In order to determine the level of students' awareness of the possibilities of using digital technologies in the educational process at the Vasyl Stefanyk Precarpathian National University, to substantiate and develop methods for using digital resources in the process of distance learning of students, to promote the formation of digital competence of future teachers and to improve the training of students, we conducted an experimental study. To solve its tasks we used the questionnaire method which covered 116 bachelor's degree students studying in the specialties "Vocational Education. Digital Technologies", "Preschool Education" at the Pedagogical Faculty, "Secondary Education (History)" at the Faculty of History, Political Science and International Relations, "Secondary Education (Ukrainian Language and Literature)", "Secondary Education (Polish Language and Literature)" at the Faculty of Philology. The proposed questionnaire – "The use of digital technologies in the educational process of a higher education institution" – contained ten questions, including direct closed questions and questions that stimulated the expression of their own suggestions, comments, and opinions on the possibilities of using digital technologies in the educational process.

The proposed questions of the questionnaire survey were aimed at finding out how students assess their level of understanding of the concepts of "digital education" and "digital technologies" (question 2) which specific digital tools

and online educational platforms they most often use in the learning process (questions 3, 4). The questionnaire helped to study the effectiveness of the use of digital technologies in the educational practice of future teachers (question 5) and the level of student satisfaction with the use of digital tools in distance learning (question 6). It was important to find out whether digital tools facilitated access to educational resources and materials that students worked with (question 7). The respondents also commented on the shortcomings they noticed in the use of digital tools for distance learning (question 8). In the course of the survey its participants submitted proposals for improving the use of digital tools in the university educational process (questions 9–10).

The quantitative results of the survey on "The use of digital technologies in the educational process of higher education institutions" made it possible to determine the age of the survey participants: 17–18 years old (81%), 19–20 years old (17%), and the rest of the respondents were 21–25 years old (2%).

The answers to the question "How do you assess your level of understanding of the concepts of 'digital education' and 'digital technologies'?" were distributed as follows: high – 11.2%, above average – 36.2%, average – 46.6%, below average – 4%, low – 2%. Thus, the self-assessment of digital literacy showed that 47% of students have a high and above average level of understanding of the basic concepts of digitalization of the educational process (Figure 1).
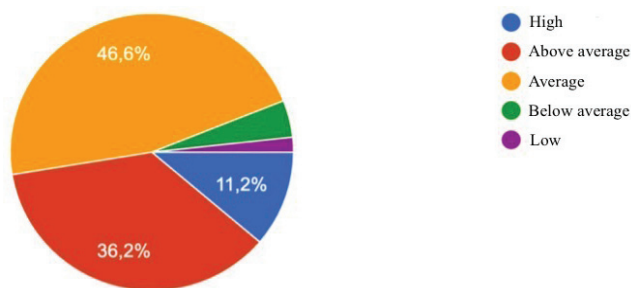

Figure 1. Students' self-assessment of the level of understanding of the concepts of "digital education" and "digital technologies"

Source: Authors' own study.

The experiment was interested in answers to questions about the specific digital tools that students most often use for studying. Among them the most popular among respondents are Telegram (90.5%), Zoom (86.2%), Google Meet (77.6%), Classroom (75.9%), Viber (75.9%), ChatGPT (67.2%), Canva (60.3%). CapCut (36.2%), Quizizz (31%), Kahoot! (19%), Discord (17.2%), Microsoft Teams (13.8%), LearningApps (10.3%) are used to a much lesser extent. The least popular among students are Miro (6%), Padlet (6%), Moodle (3.4%), Wordwall (3.4%), ThingLink (2.6%), Prezi

(1.7%), StoryMap (1.7%), Blogger (1.7%), Blackboard (0.9%), Genial.ly (0.9%), Glogster (0.9%), Edmodo (0.9%), and others (3%) (Figure 2).
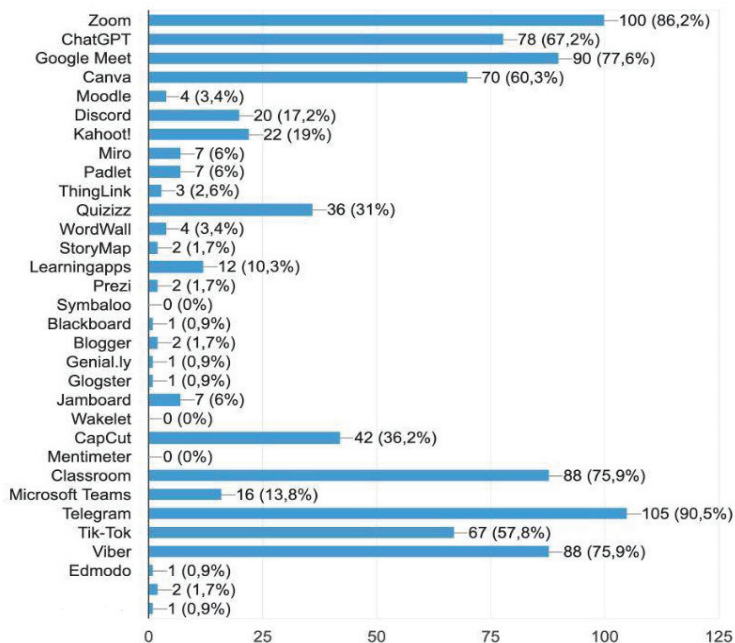

Figure 2. Respondents' answers to the question about the digital tools they most often use for learning
Source: Authors' own study.

Of particular interest is the opinion of students about the online educational platforms they use in the learning process. The most popular were Vseosvita (47.4%), Prometheus (15.8%), Duolingo (10.5%), EdEra (9.5%). Such platforms are used much less in the educational process, they are Diia.digital education (6%), Google Digital Workshop (4%), Coursera (1%), EdX (1%), Udemy (1%), EduHub (1%), other (2%) (Figure 3).

Figure 3. Respondents' answers to the question about the online educational platforms they use most often in the learning process

Source: Authors' own study.

In the course of the pilot study it was also important to find out how the survey participants assessed the effectiveness of using digital technologies in their own educational practice. In this context 54% of respondents indicated high effectiveness, 45% – medium effectiveness, and 1% – low effectiveness.

In today's challenging environment when martial law has been introduced and students are often forced to study remotely or in a blended format it was important to find out how satisfied they are with the use of digital tools in this mode of operation. The answers of students to question 6 helped to understand the following: always satisfied (35%), often satisfied (43%), sometimes satisfied (22%).

To the question "Do you think that digital tools have facilitated your access to educational resources and materials?" the following answers were received: yes (96%), not quite (4%). This indicates the importance and necessity of further active use of educational digital resources in the process of mastering knowledge, skills and abilities by future professionals.

In the process of experimental research we aimed to find out what shortcomings accompany the process of using digital tools for distance learning in higher education institutions. Survey participants indicated the following problems: unstable Internet connection (57.8%), fatigue from the screen (19.8%), difficulty in using certain programs or platforms (11.2%), problems with the hardware part (camera, microphone) (9%) (Figure 4).
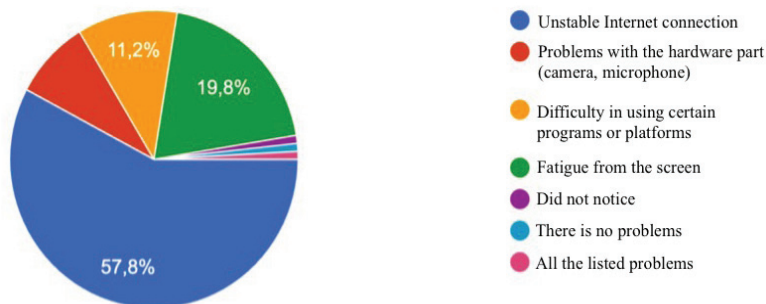

Figure 4. Respondents' answers to the question about the disadvantages of using digital tools for distance learning

Source: Authors' own study.

For the full use of digital tools in the educational process of higher education institutions the answers of the respondents to the last two questions of the questionnaire were important where they expressed their own suggestions for improving the digitalization of the learning environment at the university. The most interesting and meaningful proposals, in our opinion, are the following:
–   use more digitized textbooks and other teaching materials;
–   practice a variety of teaching models;

– practice more lectures in which teachers use various platforms for interactive tasks to improve the memorization of educational material;
– establishing a stable Internet connection;
– use more different computer programs in the learning process;
– improve individual online learning platforms;
– more actively move from traditional, standardized teaching methods to innovative, interactive ones;
– provide multimedia whiteboards in as many classrooms as possible;
– more actively introduce innovative pedagogical technologies into the university's practice including business games, quest technologies, online games, training and learning, case method, master classes, etc.

CONCLUSIONS

Thus, the experimental study shows that the problem of using digital technologies in the professional training of future teachers is relevant and multifaceted. Students widely use digital platforms for learning, communication, information exchange, and recreation. The survey helped to find out the level of digital culture of students, to investigate the effectiveness of digital technologies in the learning process, and to study the level of student satisfaction with digital tools in distance and blended learning. It was useful for improving educational practice by identifying shortcomings in the use of ICTs during classes and summarizing respondents' suggestions for improving the methodology of their use in the educational process of higher education institutions.

The prospects for further research in the field of digital education in higher education institutions are the study of the didactic conditions for the use of information and communication technologies in the professional training of future teachers and the development of practical recommendations for the use of digital tools in the process of teaching and educating students.

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ABSTRAKT

W artykule podkreślono sposoby wykorzystania technologii cyfrowych w systemie szkolnictwa wyższego Ukrainy w kształceniu zawodowym przyszłych nauczycieli w kontekście współczesnych wyzwań społecznych. Uzasadniono znaczenie zasobów cyfrowych w organizacji kształcenia na odległość i kształcenia mieszanego w stanie wojennym. Podkreśla się, że informatyzacja społeczeństwa i działalność instytucji edukacyjnych znacząco wpływają na kształtowanie treści, form organizacyjnych, metod nauczania i zarządzania. Podnosi się, że kultura cyfrowa nauczyciela implikuje wysoki poziom kompetencji cyfrowych, tj. umiejętność pracy z nowoczesną technologią cyfrową i opanowania nowoczesnych technologii informacyjno-komunikacyjnych. W artykule przedstawiono wyniki badania eksperymentalnego przeprowadzonego w Podkarpackim Uniwersytecie Narodowym im. Wasyla Stefanyka „Wykorzystanie technologii cyfrowych w procesie edukacyjnym instytucji szkolnictwa wyższego". Zostało ono przeprowadzone w celu określenia poziomu świadomości studentów na temat możliwości wykorzystania nowoczesnych narzędzi cyfrowych w trakcie kształcenia, uzasadnienia i opracowania metod wykorzystania zasobów cyfrowych w procesie kształcenia na odległość i mieszanego, promowania kształtowania kompetencji cyfrowych przyszłych nauczycieli i poprawy przygotowania studentów do działalności zawodowej. Podkreśla się, że badanie eksperymentalne pozwoliło zidentyfikować i określić dydaktyczne i praktyczne perspektywy wykorzystania technologii cyfrowych w procesie rozwoju zawodowego studentów. Stwierdzono, że w procesie cyfryzacji kształcenia zawodowego przyszłych nauczycieli należy zwrócić szczególną uwagę na tworzenie interaktywnych środowisk edukacyjnych, stosowanie metod cyfrowych i innowacyjnych technologii nauczania pedagogicznego, kształtowanie kompetencji cyfrowych studentów, a także rozwój sieci współpracy między uczestnikami procesu edukacyjnego w kontekście globalnych wyzwań.

Słowa kluczowe: edukacja cyfrowa; technologie cyfrowe; kompetencje cyfrowe; wyzwania społeczne; instytucje szkolnictwa wyższego