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Innovative experimental activities in the education system of Ukraine in the conditions of war

SVITLANA NUZHNA. Innovative experimental activities in the education system of Ukraine in the conditions of war. *The problem of organizational transformation of the educational process with the beginning of the war in Ukraine is considered. Attention is focused on the role of innovative technologies to ensure a safe situation for the continuation of the educational process using all available forms: online (with the use of IT technologies), offline and in a mixed mode. The effectiveness of the use of modern information and web technologies to build a communication environment for education seekers has been proven. The top 100 learning tools of 2022 are characterized and have been implemented in all forms of learning: formal, informal, experimental and social. Examples of the application of the modular object-oriented dynamic platform Moodle for distance education in higher education institutions are presented. The use of Google digital tools, namely Google Classroom, in the educational process is proposed. Determining the rapid spread of the mobile Internet in the 21st century, it is emphasized that this provides an opportunity to*

introduce mobile gadgets into the educational environment of educators. One of the examples of such application is the use of QR codes to access information and implement the educational process. All considered modern technologies contribute not only to high-quality education, but also to the formation of digital competence of both students and teachers.

Keywords: *innovative technologies, educational activity, Google digital tools, learning tools, distance learning, mobile gadgets.*

1. Introduction

Military events, which are taking place with the beginning of the full-scale military aggression of the Russian Federation against Ukraine, are a stress for all participants of the educational process. Under such conditions, the role of innovative technologies in the educational environment to ensure a high level of education quality in accordance with the civilizational and national challenges of the 21st century is significantly increasing.

The spread of innovative technologies in the field of education has become an objective pattern determined by the new philosophy of education. Innovations should be considered as efficient and productive novations in the content, methods, means and forms of education and personal training, in the management of the education system, in the organization of the educational process, in the structure of educational institutions.

Innovations became especially relevant with the beginning of a large-scale war, when it became vital to make quick, non-standard, essentially innovative decisions.

The functioning of the education system in the conditions of martial law is characterized by an intensive search for new approaches to learning, innovative forms of organization of the educational process, effective pedagogical and information technologies. That is why supporting the active implementation of innovations in the educational sector during the war is one of the most relevant innovations today [1].

The educational process can only be considered perfect if it ensures not only the successful satisfaction of today's social demands, but also determines general approaches to solving future problems. The formation of the intellectual elite of the nation – scientists, researchers, public figures, innovators-entrepreneurs – is another basic component of education development, it is the support of future leaders of world science and Hi-tech, the introduction of STEM education, that is, the use of modern educational technologies.

2. Main results of the research

Today, the concept of “educational technologies” is interpreted differently and is broader and more comprehensive in the educational environment. In the 21st century, educational technology is a theoretically grounded system of ordered professional actions of a teacher, which, with the optimality of resources and efforts, is guaranteed to ensure the effective implementation of the educational goal and the possibility of reproducing the process by any teacher, regardless of his skill level.

Innovation in education is considered as a realized innovation in the content, methods, techniques and forms of educational activity and personality education (such as methods, technologies), in the content and forms of organizing the management of the educational system, as well as in the organizational structure of educational institutions, in the means of education and upbringing and in approaches to social services in education. This significantly increases the quality, efficiency and effectiveness of the educational process, therefore pedagogical innovations, in accordance with the features of the latest processes in education, should cover certain theoretical blocks of concepts and principles, that is: the creation of new things in the system of education and pedagogical science, the perception of new things by the socio-pedagogical community, the application pedagogical innovations, a system of recommendations for theoreticians and practitioners regarding knowledge of innovative educational processes in education and their management.

It is worth noting that in this difficult time, the educators themselves have become more active in searching for ways to solve problems in the organization of training of education seekers, using modern information technologies. But, considering modern information technologies, the process of obtaining an education by students can take place both within the educational process directly in educational institutions and outside them. Therefore, it is impossible to leave only the teacher the right to choose educational technologies.

Analyzing the introduction and use of computer equipment and information technologies in the educational process of higher education institutions of Ukraine from the second half of the 50s to the beginning of the 90s of the 20th century allows to identify the following historical stages:

- 1) emergence of programmed learning algorithms (50s of the 20th century);

- 2) emergence of automated learning support technologies (60s of the 20th century);
- 3) the appearance of the first computer training systems and the development of the first educational environments (70s of the 20th century);
- 4) nationwide support of computer equipment and technologies at all levels of education, development of intelligent educational systems and virtual reality systems (80s of the 20th century).

What we have today in the 21st century – the World Wide Web, communication services, the development of interactive technologies, Web 2.0 have created all the conditions for the use of blogs, social networks, collective encyclopedias, photo, video, audio hosting, Wikipedia in the educational process – all this contributes to the intensification of learning [2]. Under the influence of web services, the model of education is also transformed, which is manifested in:

- openness to society of educational materials at all levels;
- openness of the results of scientific research regardless of geographical, socio-economic and other factors;
- openness of the educational process and availability of tools for collective work.

Attention began to be paid to the organization of interaction between users of Internet services in the form of public exchange of information resources and mutual evaluation. Web technologies made it possible to build a communication environment for education seekers. The educator becomes an active element of the system, which not only controls and directs his activity, but also allows him to influence the functioning and filling of the system itself.

2021 was a year of experimentation with the progressive use of tools, when users of information resources tried new things. 2022 was a year of consolidation – when users began to return to their reliable, old and favorite means of communication. In fact, many instruments that lost relevance in 2021 regained their lost positions in 2022.

The 100 Best Learning Tools of 2022 was created from the 16th annual survey and provides a visual representation of the tools on the list and how they are used in different contexts (Figure 1) [3]. The top of these tools was divided into three groups: tools for personal learning, tools for learning in workplaces and educational environments.

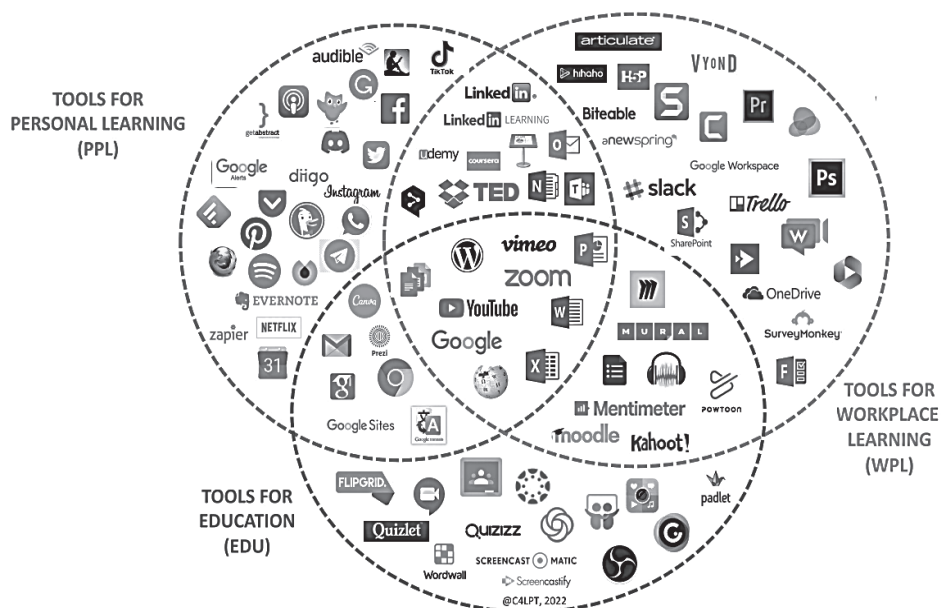


Fig 1. TOP 100 Best Learning Tools of 2022

All these tools are used for learning, which happens every day in different ways: formal and informal learning, experiential and social learning.

Formal Learning – tools and platforms that can be used to create, deliver, host and manage formal learning experiences and self-directed learning.

Informal learning is the tools and platforms that a person uses to learn something for themselves.

Experiential learning – tools and platforms used as part of everyday activities (work/life) that allow people to learn as a by-product of these activities.

Social learning – tools and platforms that can support interaction and cooperation between people.

Figure 2 therefore shows the context in which each of the top 100 tools is used and is an indicator of how learning can be fully supported to ensure a holistic approach to learning and development.

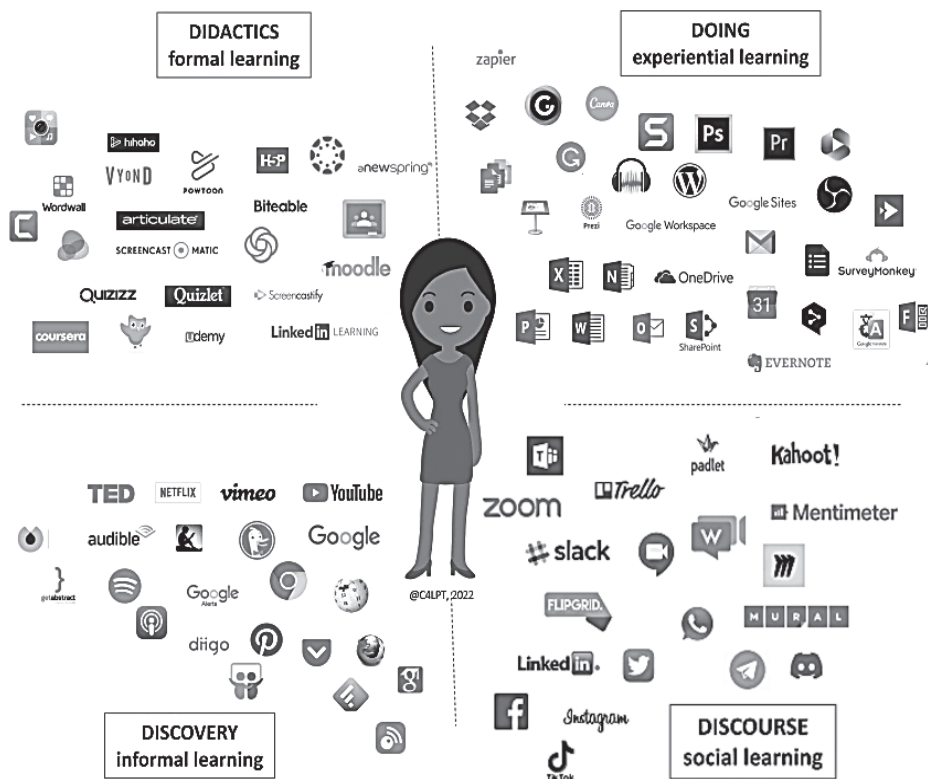


Fig 2. TOP 100 tools for learning by learning methods

Table 1 lists the 20 of the top 100 learning tools that received the highest ranking in an annual ranking from the Center for Technology for Learning and Work.

The top five tools on the list were actually the unbroken leaders: YouTube, PowerPoint, Google Search, Microsoft Teams, and Zoom – a good indication of how people and organizations see ‘learning’ today – namely not just learning/learning activities.

Table 1. Top 20 learning tools

TOP 20 OUT OF 100	Tool / Site	Using	Study groups		
			PPL	WPL	EDU
1	YouTube https://www.youtube.com	The YouTube.com website allows you to upload, save and show videos to users of the resource. This service is the largest place for hosting video files in the world, which contains videos on various topics: educational lessons and video lectures, artistic or thematic films, cartoons, music videos, vlogs (video blog), humorous programs. Today, YouTube.com is a versatile and perfectly adapted tool for conducting business and distributing various video information. It is optimized to work in 79 countries and can recognize data in 51 languages of the world, creating captions for videos.	☑	☑	☑
2	PowerPoint	Presentation software.	☑	☑	☑
3	Google Search https://www.google.com.ua	A giant powerful search engine Google.com. This resource allows: to search for information on request; image search; detailed search. Google.com simplifies the selection of specific information among already selected sources according to certain parameters. Google also implemented the voice search function to make it easier for people with disabilities. In addition, on the site you can set up personal or corporate mail, set up contextual advertising for promotion, save documents, determine the location, monitor statistics and perform several other operations.	☑	☑	☑
4	Microsoft Teams https://www.microsoft.com/uk-ua/microsoft-teams/download-app	A corporate platform for cooperation that combines chat, meetings, notes and attachments in the workspace. Developed by Microsoft as a competitor to the most popular corporate solution Slack.	☑	☑	☑
5	Zoom https://zoom.us	Video meeting platform.	☑	☑	☑
6	Google Docs & Drive	Office suite/file sharing platform.	☑	☑	☑
7	LinkedIn https://ua.linkedin.com/	A professional social network for finding and establishing business contacts.	☑	☑	

8	Word	A text editor for creating, editing and maintaining document flow at enterprises and organizations.	✓	✓	✓
9	Canva https://www.canva.com/uk_ua/osvita/	A graphic design platform that allows users to create graphics, presentations, posters and other visual content for social networks. The service offers a large bank of images, fonts, templates and illustrations.	✓		✓
10	Wikipedia https://uk.wiktionary.org/wiki/	Online encyclopedia.	✓	✓	✓
11	Slack https://slack.com	Corporate messenger for teamwork. Launched in beta in August 2013, the public release took place on February 12, 2014.		✓	
12	Excel	A spreadsheet processor for working with data, analyzing it and graphically presenting it, contains powerful tools for forecasting and optimizing work with data.	✓	✓	✓
13	Twitter https://twitter.com/	Social network.	✓		
14	WordPress https://uk.wordpress.org	Freely distributed open-source content management system; written in PHP; database server – MySQL. The scope of application ranges from blogs to fairly complex news resources.	✓	✓	✓
15	Articulate https://articulate.com	E-learning tools.		✓	
16	Kahoot https://kahoot.it/	Live interaction tool. A game learning platform used in schools and other educational institutions.		✓	✓
17	Mentimeter https://www.mentimeter.com/	Online service for creating and conducting instant polls in the audience and during webinars. The main features and limitations of the free version of the service: with one access code, you can give students access to no more than two surveys of the general or advanced type, as well as five questions in the Quiz mode; the teacher can create an unlimited number of surveys of different types using different access codes, as well as organize them in his profile in folders; you can create online presentations with an unlimited number of text slides, to which you can also add images or links, as well as embed videos, add polls [4].		✓	✓
18	Instagram https://www.instagram.com	Photo sharing social network.	✓		
19	Facebook https://uk-ua.facebook.com/	Social network.	✓		
20	Vimeo https://vimeo.com/	Video hosting and sharing platform.	✓	✓	✓

Here's how the top 100 learning tools of 2022 were divided into 5 key areas [3] (Figure 3).

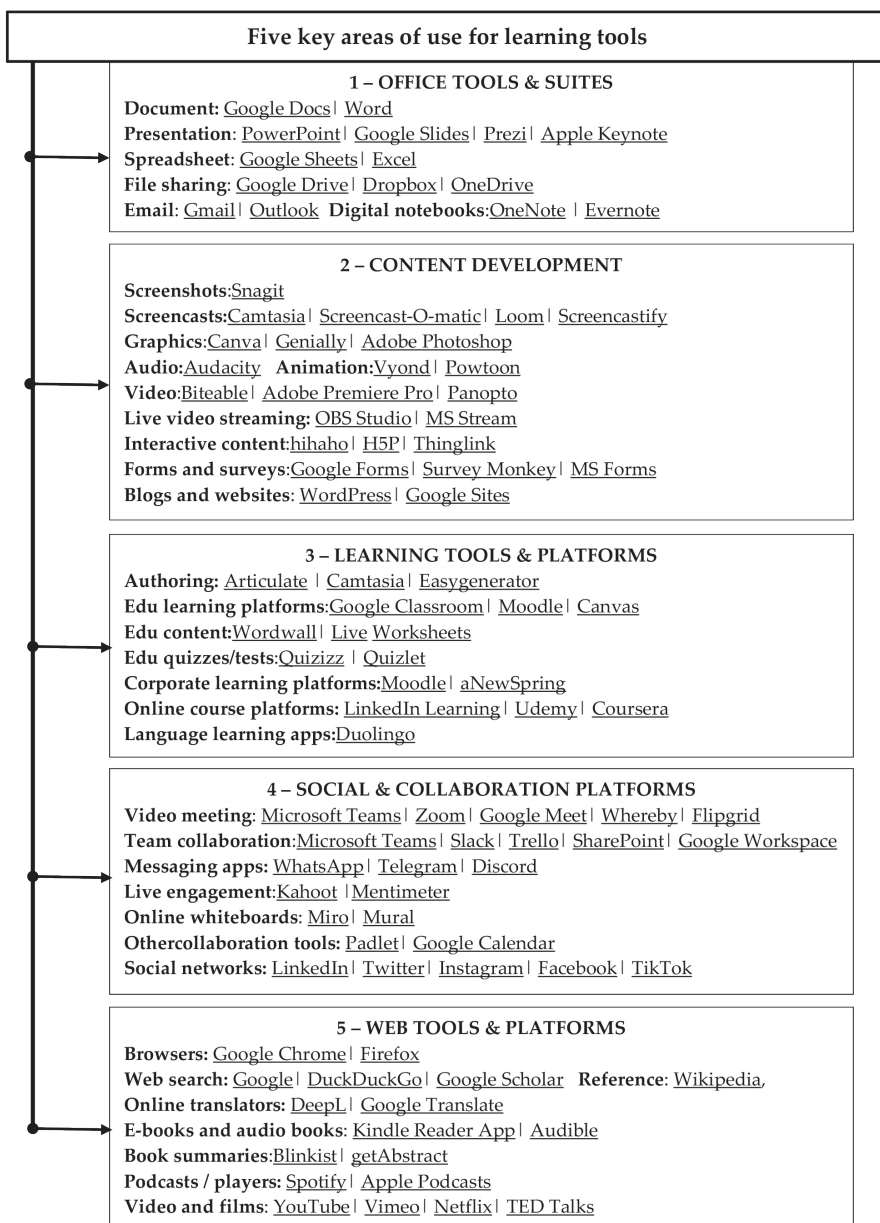


Fig 3 – Areas of use of the TOP 100 educational tools

If we consider the tools as educational technologies, then all of them are aimed at the professional development of pedagogical and scientific-pedagogical workers in terms of the organization of the educational process using forms, methods, techniques and ways of learning, which will allow to activate the educational and cognitive activity of students/pupils.

The modern present of the educational process, for example in higher educational institutions, is the creation of such a high-tech information-communication educational-scientific environment in which an educator is every day in the process of the entire period of study at a higher school, which must meet the needs of the information society, the current state of the development of science and technology, global educational standards and to promote the formation of information and communication competences of all participants in the educational process, from the professor to the student.

Among the innovative technologies, based on which a new educational environment is created in higher education institutions, where students can access educational materials at any time and in any place, there are electronic (distance, mobile) learning technologies, the use of which makes the educational process more attractive, democratic, comfortable and will stimulate students to self-education and lifelong learning.

Many educational institutions have opened freely accessible platforms with their educational materials. One of the means of information and communication technologies that meets the specified conditions is the Moodle system – a modular object-oriented dynamic learning environment, which is a freely distributed educational content management system.

The Moodle system provides an opportunity to organize a full-fledged educational process, including learning tools, a system for monitoring and evaluating students' educational activities, as well as other necessary components of the electronic learning system. Moodle is recommended to educational institutions as the most developed electronic learning system with a multilingual interface, in particular, the localization of the system in the Ukrainian language.

In many universities of Ukraine, the distance learning platform Moodle is used in the educational process. All measures of the educational process using Moodle distance technologies allow authorized access to the information and communication tools of the distance learning organization of the system, the ability to determine the start and end time of access, the duration of tasks, and the ability to check the results of tasks. For communication between teachers and

students, a set of educational and methodical materials is created in Moodle for each discipline: lectures, practical work for subgroups and groups, questions for self-examination, independent and control work.

When uploading subject materials to Moodle, the teacher has the opportunity to connect students to the course, limit access to specific course topics, and set the deadline for practical, independent and control work. The system's capabilities allow you to view and review the course materials, check and evaluate completed tasks, and conduct consultations on completing tasks in the chat. In addition, even if the student received a grade, the system has the possibility to change the results, time to revise the work or correct errors. The teacher independently adjusts the actions within the course.

Remote communication of the participants of the educational process can be carried out through means of communication built into the Moodle system, e-mail, messengers (Viber, Telegram, etc.), video conferences (MS Teams, ZOOM, Google Meet, Skype, etc.), forums, chats, etc.

So, thanks to the concept of open software, which the developers of the system profess, the features of the technological platform and its functional capabilities, Moodle is becoming more and more widespread in the world information and educational space. Today, the Moodle system is used not only in universities, but also in secondary schools, non-profit organizations, private companies, individual teachers and even parents who teach their children independently.

An analogue of the Moodle system for organizing the educational process is the use of Google's digital tools, namely, Google Class.

Google Classroom is a universal place for teaching and learning. The easy-to-use and secure tool helps teachers manage, measure and enrich the learning process. Google Classroom allows you to combine all learning tools in one place and manage several classes in one place. Any member of the school community can get started with Class in minutes. It is possible to work simultaneously on one document with the whole class or communicate face-to-face using Google Meet; empower teaching and learning from anywhere, on any device, and make your classroom more flexible and mobile.

In addition to Classroom, Google offers several services and tools for various needs, including educational ones. Most of them are web applications that only require the user to have a browser in which they work and an Internet connection. This allows you to use data at any point on the planet and not be tied to one computer. The advantages of Google

services and tools are the availability of a centralized data repository and a well-thought-out user interface.

The Ministry of Education and Science of Ukraine, with the support of Google Ukraine, is organizing free training within the framework of the “Google Digital Tools for Education” program, which will be carried out during 2022/2023, in order to expand the possibilities of using digital tools for the organization of distance learning and increase the efficiency of the educational process. academic year [5, 6].

The rapid spread of mobile Internet and compact devices has opened a lot of opportunities to the world. In this regard, such an educational trend as mobile learning is becoming more and more relevant. Today's practice shows that mobile devices and applications are easily integrated into the learning process and make it more effective. The student of the 21st century is progressive and has access to any information from world sources with the help of his gadgets. Students themselves are using mobile technologies more and more and use them regularly in their personal lives. Therefore, it is not surprising that for today's young people it will not be difficult to use mobile devices for learning, and not only for their specific needs. One example of such an application is the use of QR codes to access information. It is the active use in everyday life, the ease of reading and coding, and the presence of smartphones in most of the population that made the use of QR codes popular among teachers and students for education. After installing the recognition program, the student can instantly enter text information into his phone, add contacts to the address book, follow web links, send SMS messages, watch lectures and take tests during the educational process.

It is worth noting that modern technologies contribute not only to the high-quality study of educational subjects, but also to the formation of digital competence of both students and teachers. The use of mobile phones in classes leads to saving time, increasing the motivation of educators and high-quality feedback between teachers and students

During distance learning, test control is widely used to determine the level of knowledge, which fully considers all control functions. Test control of students' knowledge, abilities and skills makes it possible to assess students' academic performance effectively and objectively. Many programs and services are used to create tests, to control students' knowledge, for example, Online Test Pad, it is also possible to create a test using Google Forms or on the Moodle platform, etc. The innovative testing system for educators from schoolchildren to students on the Vseosvita website is easy to use.

3. Conclusions

Therefore, both during the war and after its end, the main task of the educational sector is and will be ensuring the quality of education at all levels. Therefore, it is quite natural to carry out scientific research in education and implement their results in work practice, to introduce innovative technologies, to provide educational institutions with new teaching aids, scientific methodical and educational literature.

Today, every educator of the 21st century must be clearly aware of the trends in educational technologies for the intensification of learning and master the skills of using these technologies in 21 days. As we can see, despite the difficult conditions in which our country is today, innovative and research-experimental activity in the education system continues, and its result is new pedagogical thinking, new pedagogical ideas, forms of education and models of organizing the educational process.

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Abstracts

СВІТЛАНА НУЖНА. Інноваційна експериментальна діяльність в системі освіти України в умовах війни. Розглянуто проблему організаційної трансформації освітнього процесу з початком війни в Україні. Зосереджено увагу на ролі інноваційних технологій для забезпечення безпекової ситуації продовження освітнього процесу з використанням усіх доступних форм: онлайн (із застосуванням ІТ-технологій), офлайн та у змішаному режимі. Доведено ефективність використання сучасних інформаційних та веб-технологій для побудови комунікаційного середовища здобувачів освіти. Охарактеризовано 100 найкращих інструментів для навчання 2022 року, які були впроваджені в усі форми навчання: формальне, неформальне, експериментальне та соціальне. Наведено приклади застосування модульної об'єктноорієнтованої динамічної

платформи Moodle для дистанційної форми навчання в закладах вищої освіти. Запропоновано використання у навчальному процесі цифрових інструментів Google, а саме, Google Classroom. Визначаючи стрімке поширення мобільного Інтернету у XXI столітті, наголошено, що це надає можливість впровадження мобільних гаджетів у навчальне середовище освітян. Одним з прикладів такого застосування, є використання QR-кодів для доступу до інформації та здійснення освітнього процесу. Всі розглянуті сучасні технології сприяють не лише якісному навчанню, а й формуванню цифрової компетентності як здобувачів освіти, так і викладачів.

Ключові слова: інноваційні технології, освітня діяльність, цифрові інструменти Google, інструменти навчання, дистанційна форма навчання, мобільні гаджети.

SWIŁANA NUŻNA. Innowacyjna eksperymentalna działalność w ukraińskim systemie oświaty w warunkach wojny. W artykule autorka przybliżyła problem transformacji organizacyjnej procesu kształcenia po wybuchu wojny w Ukrainie. Szczególną uwagę zwrócono na rolę innowacyjnych technologii w zapewnieniu uczniom bezpieczeństwa i kontynuacji nauki w ukraińskich szkołach w różnych trybach: zdalnym (wykorzystanie nowych technologii informacyjno-komunikacyjnych), stacjonarnym i hybrydowym. Udowodniono skuteczność wykorzystania nowoczesnych technologii informacyjnych i technologii webowych w celu stworzenia komunikacyjnego środowiska dla uczniów szkoły średniej. Autorka scharakteryzowała 100 najlepszych narzędzi do nauki w 2022 roku, które efektywnie wspomagają różne typy edukacji: formalną, nieformalną, społeczną i eksperymentalną. Przytoczono przykłady efektywnego wykorzystania platformy e-learningowej Moodle do nauczania zdalnego w szkołach wyższych. Autorka proponuje wykorzystanie narzędzi Google, a mianowicie Google Classroom podczas nauczania. Biorąc pod uwagę dynamikę upowszechnienia mobilnego dostępu do internetu w XXI wieku, autorka podkreśla, że pozwala to wykorzystywać urządzenia mobilne przez nauczycieli do celów edukacyjnych. Jednym z przykładów efektywnego zastosowania nowoczesnych technologii, jest wykorzystanie kodów QR w edukacji, które ułatwiają dostęp do materiałów i usprawniają proces edukacji. Wszystkie opisane nowoczesne technologie nie tylko usprawniają proces nauczania, ale też sprzyjają kształtowaniu kompetencji cyfrowych u uczniów i nauczycieli.

Słowa kluczowe: innowacyjne technologie, działania edukacyjne, cyfrowe narzędzia Google, narzędzia do nauki, kształcenie na odległość, gadżety mobilne.